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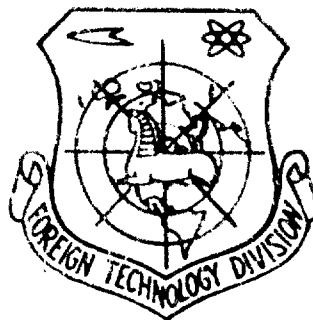
# FOREIGN TECHNOLOGY DIVISION



## FUNDAMENTALS OF MILITARY MEDICINE

By

Kurt Geiger



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## EDITED TRANSLATION

FUNDAMENTALS OF MILITARY MEDICINE

BY: Kurt Geiger

English Pages: 206

TM5002560

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GRUNDLAGEN DER MILITÄRMEDIZIN

Deutscher Militärverlag

Berlin 1964

Pages: 225

FTD-TT-65-1514/1+2+3+4

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## INTRODUCTION

Organization of the military protection of our Republic requires that we start from a realistic evaluation of the nature and main characteristics of a possible future war. This estimation may be summarized as follows:

The world war unloosed by the Imperialists would represent the decisive armed clash between the two opposing social systems. It would be conducted by both sides with as yet unknown ferocity and the application of nuclear weapons. Such a war would be characterized by the use of armies numbering in the millions, high mobility and maneuverability of the troops over large surfaces and into deep spaces, the lack of compact stable fronts and that of a sharp boundary between the field of operations and the hinterland. The initial period of war might exert a decisive effect not only on its course but also on its outcome.

The tasks to be accomplished in a possible future war by the Medical Service of the National People's Army and the cooperating civil health authorities, and the conditions under which these tasks have to be performed would be basically different from those of all prior wars. The lack of a sharp boundary between military operations and the hinterland, the massive number of injured to be expected, in their majority, completely new and complex injuries and other specific features of modern war will present problems that cannot be solved without a basic knowledge of military medicine. Therefore, both, members of the Medical Service and those of the civil Health Service must become acquainted with the basic rules according to which the injured have to be graded,

medically treated and transported and the organization of other work.

These considerations were the starting point for this work conceived as a textbook for use in the teaching of the basic knowledge required for securing the medical side of national defense. It was written for members of the Medical Service of the National People's Army, participants in courses on military medicine for members of the reserve and those seeking higher qualifications, for the obligatory peripheral advanced instruction of civilian physicians, dentists and pharmacists, for participants in advanced courses at the German Academy for Graduate Medicine and for medical students.

Indication for the reader: the superscripts in brackets refer to the bibliography, those in parentheses to the respective chapters or paragraphs of the book.

the author

## 1. MILITARY MEDICINE AND MEDICAL SERVICE

Our historians dispose of quite reliable data on human life and on the development of society in the past 5600 years. Out of these 5600 years, there were only 292 years without war, 292 years of peace; during the same period, historical statisticians determined 14,531 great and small wars. Almost 3,640 billion men lost their lives in these wars.

### 1.1. WAR AND WARFARE

War is a historic phenomenon closely related to class society. Marxism-Leninism has proved that the bases of politics and the causes of every war are related to the character of the economic order, the conditions of production.

War is the result of society's division into antagonistic classes, due to the appearance of private property in the means of production. It is the product of a certain developmental level of the economic order in human society; it became a social sign of this order and becomes history with it. War belongs to that period of human society which Friedrich Engels called the prehistoric times of humanity.

By establishing scientific proof that war is a product of the economic order of exploitative society, Marxism-Leninism created not only the prerequisite for the correct analysis of each war but also a weapon in the struggle against war.

To abolish war, it is necessary to get at its roots and fight the exploitative order. War will disappear forever when conditions of socialist production prevail over the whole planet.

If the generation living in the middle of the 20th century does

have the possibility of inhibiting further wars it owes this to the fact that there exists a world-wide economically and militarily powerful socialist system which exerts a decisive influence on the course of world history.

Since when have there been wars? The answer points towards the relationship between war and the developmental stage of productive forces; only after more was produced than could be used by the producer, only then could there develop classes, states, armies and thus war.

War requires weapons. Friedrich Engels wrote in his book "Anti-Dühring" on the relationship between war and the economy: "Nothing is more dependent on economic conditions than army and navy in particular. Arms, composition of armed forces, organization, tactic and strategy depend primarily on the specific stage of production and transportation. Radical changes were not the "independent creations of a military leader's genius but resulted from the invention of better weapons and changes in the soldier material..."[10].

The conduct of war changes with the development of productive forces and the conditions of production. There was a time when wars were conducted with spears; a third world war would be conducted with nuclear weapons. Spears and nuclear weapons belong to different developmental levels of production; in the interim period multiple changes of productive forces and conditions of production exerted their influence on the conduct of war. We know about the radical change effected by the invention of gun powder and guns, but we are also aware of the effect of an event such as the French bourgeois revolution. According to the developmental level of productive forces, thus war technique, the development of warfare may be divided into three periods. The first period encompasses the time when individual weapons (spear, cross-bow, rifle) were basic for armed fight. This period ends with the 19<sup>th</sup> century. The wea-

1

pons used during that century for group fight (cannons) had no essential effect on the outcome of armed fight, for their number and quality was exceedingly low. The second period started with the 20th century and revealed its characteristics particularly during the first World War. During this period of warfare, the means for group fight became basic for the methodic conduct of armed fight. Methods of group fight were refined during the second World War by the massive introduction of airplanes and armored tanks. The third period in the development of war technique and the military starts with the development and use of means for mass annihilation, nuclear weapons, war poisons, biologic weapons. In a future war, these would be basic methods for armed fight.

#### 1.2. MILITARY MEDICAL SERVICE

A modern army cannot be imagined without a well organized sanitation system, or a medical service as it is now called. In the socialist armies and thus also our National People's Army, the medical service assumes particular importance due to the high humane ideals of Marxism-Leninism. In our system, the human being, conservation of his physical and mental forces, occupies the center of social attention. Importance and role of the Medical Service have considerably increased under conditions of modern war which, unless inhibited by peace-loving men and states, will be a war applying means of mass annihilation [32].

##### 1.2.1. Historical Development

No organization even remotely resembling a medical service existed in the armies of antiquity and the Middle Ages, although an attempt was made to help the injured during and after the battle, depending on the political structure of the country, the state of productive forces and developmental level of medical knowledge. There was no possibility of doing otherwise for lack of the prerequisites for developing a regular army medical service, for organizing medical care and for moving the

injured from the field of battle. These prerequisites came into being only with the appearance of a standing army, the creation of installations for medical treatment (field hospitals), the availability of means for transporting the injured and the development of medical knowledge to a level which made it possible to establish basic rules for the treatment of the injured and sick. Only by the second half of the 17<sup>th</sup> and the beginning of the 18<sup>th</sup> century did this apply to European countries.

We know about the state of medical knowledge in ancient Mesopotamia, the medical opinions and accomplishments of ancient Egypt; we know that the Greeks had physicians at an early period, and that Athens at the peak of its glory produced a great personality in the medical field, Hippocrates, born on the island of Cos (466-377 B.C.). However, nowhere do we find a line in the works of Greek and Roman historians specifically referring to an organization for field sanitation, a medical service in the ancient armies [15].

In ancient times, the warriors certainly were their own physicians. They administered aid to themselves and their comrades as best they could. Basic instruction in field surgery was part of youth military education. Every warrior had to know how to remove arrow and spear points, stop bleeding and apply first aid dressing. We thus read in the 16<sup>th</sup> book of Homer's Iliad that Patroclus nurses Eurypylos' wounds in the latter's tent, for he knew the art of healing as did Achilles who had been taught by Cheiron. The physician Machaon was present in the Greek camp before Troy. Other lines in the Iliad permit a conclusion on the presence of a large number of physicians or healers; this was considered necessary and natural in war. No sign of such opinions will be found in the writings of the following 700 years.

Special military physicians are found for the first time in his-

tory in the Spartan armies. They were, just as soothsayers and flute players, a necessary part of the army. This fact is related to the political order of Sparta, for in this slaveholder state only members of the ruling class, the Spartans, served in wars.

Since the Spartans had to crush the almost continuous uprisings of their slaves, the Helots, they developed a close military organization. They lived in camps like warriors, always ready to take up arms. They did no productive work and considered agriculture and crafts debasing occupations, spending most of their time in military exercises and warfare. Thus their physicians naturally assumed the role of military physicians. Physicians were highly respected; they were full citizens, lived in a state-owned tent with other noncombatants, took up a certain location in the battle order and treated wounded Spartans. The ruling class thus took the best possible care of its needs under the given circumstances.

In the works of historians reporting on the Roman republic, there is not a single line which would permit a conclusion on the presence of physicians in the Roman armies. If the presence of physicians in the camps is mentioned, this refers to private physicians of the rich rather than military physicians for all of the injured and may be explained by the fact that no standing army existed prior to Augustus; the army was dissolved after the end of each military campaign. As long as this was done no organized medical field service could be created. The presence of physicians in an army at war was accidental rather than organized. Such an organization would have been difficult to create, for up to Augustus' time Rome's physicians were foreign, Greek slaves. They belonged to the despised professions and achieved success in their claim for Roman citizenship only under Julius Caesar. To take such people along into the field in an official function would have been against

the pride of the Roman soldier. Thus, the soldiers applied first aid to each other; they always carried dressings, moved injured comrades to the back of the lines, into camp or their allies' towns. There they were placed into private homes for nursing. If they could not be transported over such distances, they were put into tents together with their well comrades. That was all the care available for the injured and sick at that time and explains why the number of those dying after the battle exceeded that of deaths in battle.

The increasingly frequent revolts of the oppressed slaves forced the slaveholders to abandon the old republican form of government and establish a military dictatorship under a single individual. Sulla, Pompey, Caesar Octavian were military commanders relying on a professional army for which war was the main occupation. Prospects of spoils of war induced the soldiers to go anywhere they were ordered to. Every capable commander who knew how to handle soldiers and who gave them the possibility to make money could rely on their support for gaining power. The establishment of such a standing army under Augustus made it possible to organize a regular field health service. In fact, the emperors were forced to take such measures. It was not pity or worry for the injured soldiers that caused the establishment of medical service; the commanders had to guarantee their mercenaries that they would receive some care and treatment when injured. When Augustus reorganized the army he included for the first time physicians into its ranks.

The establishment of a standing army by Augustus and the right to full citizenship obtained by Rome's practicing physicians thus determined the organization of a military medical service for the first time in history. If, during the Roman republic, the injured had first been carried behind the lines and from there into camp, placed into tents and cared for by their comrades, so-called valetudinaria were now es-

tablished. In the beginning these were tents for lodging the wounded and sick soldiers. These shelters developed into true compact field hospitals. In their outlines, these earliest military valetudinaria which were assigned a certain location within the camps distinctly reveal the layout of the Greek-Roman private home. These military hospitals disposed, aside from the medical staff, of lower rank employees for administration of the valetudinaria. This organization and structure resembles the modern medical field service.

For battles, there was an ambulance corps for transporting the wounded soldiers from the field. Each division of 400 cavalry men was followed, at a distance of 200 feet, by a selected group of unarmed men who had to take care of severely injured soldiers and administer first aid. Those with slight injuries remained in the tents with the well soldiers while severe injuries were treated in the valetudinaria.

Such was the organization for treatment of the injured in the Roman empire of the first centuries A.D. The last traces of Roman medical service in the field disappeared with the decline of Rome and the disappearance of the slaveholder society.

From the fall of Rome to late into the 17<sup>th</sup> century, we find no trace of a uniform, organized military medical service. The armies of that time completely lacked the character of a large standing governmental organization and thus also a regular institution for continuous medical service.

During the first decades of the 15<sup>th</sup> century, France furnishes the one exception to this rule. King Charles VII (1422-1461) created a standing army of infantry and cavalry which received pay and was directly subordinate to the king. Here military medical service, which had disappeared with the Roman army, clearly reappears. In Louis XIII army (1610-1643), each regiment had a surgeon major; there were mili-

tary hospitals in Paris, Lille, Besancon, Nancy, Strasbourg and Metz. The illustrious and glorious period of French military medicine and surgery had its beginnings at that time [15].

Only very late do we find traces of such orderly medical service in the German history [52]. During the first 1500 centuries A.D. of German history no regular medical service existed for the military. The sovereigns used to take their personal physicians along to camp. Every commander tried to get hold of a capable "surgeon colonel" for his corps. Thus Vesal became the emperor's personal physician in 1544 and accompanied Karl V (1519-1556) into the field. The companies occasionally had lower-rank surgeons who accompanied them into the field with their drugs and instruments and treated the injured in camp. Those who could be transported were taken along in private carriages upon leaving camp while those whose wounds made transport impossible were sent to the next village for private nursing.

Particularly poor was care for the injured in the mercenary armies. The troops were dissolved after the war had ended, received their pay and were dismissed. The mercenaries dispersed over the land, either to return as rather dubious elements to civil life or to seek new enlistment, turning to where a commander with a reputation for courage, generosity and luck in war tried to drum up recruits. It was only natural that these nomadic armies of mercenaries, composed of all nationalities, eager for robbery and spoils and held together only by hopes for high pay and rich spoils would be considered worthless ballast when injured, and no commander took any interest in them.

We would repeat that systematic organization of a military medical service was started in the European countries only in the second half of the 17<sup>th</sup> century.

### 1.2.2. Treatment on Location and System of Transfer

The history of military medicine shows multiple forms and methods for organizing treatment of the injured. However, the effect of two contrasting tendencies is always apparent: that of treating the wounded and sick close to the field of operation (treatment on location) and the tendency to remove them from the zone of military operations (system of transfer).

The tendency to treat the wounded and sick in the immediate proximity of the battlefield arose from attempts to give them the required rest and avoid the harmful effect of transport on the process of recovery. At the start of organized medical service, this was motivated by pity; later this tendency was based on the requirements of medical knowledge. However, possibilities for lodging and nursing the injured within the zone of battle were limited. Another consideration was the negative effect on the fighting morale of the troops to be expected from the sight of an accumulation of injured close to the field of battle, particularly at its start. We would want to stress that both tendencies in organization of care and nursing of the injured are parts of a whole and are closely linked. One or the other method will be preferred depending on various conditions and situations [15, 24].

The following factors determined and determine when the system of treatment on location is to be preferred over that of transfer:

1. At the start of an organized medical service in the field the necessary equipment was not yet available and methods of treatment were primitive by present standards.

2. Battles were fought without extensive maneuvering. The troops marched to their encounter with the enemy and fought the "decisive battle" which determined the outcome of the campaign or of the war itself. The battles at Austerlitz (1805) or Jena and Auerstedt (1806) are exam-

ples of such decisive battles. In such cases, no change in the location of medical installations was required [21, 51].

3. Partial or complete lack of means of transportation may require treatment and care of the injured within the zone of battle; fighting conditions or other factors such as poor roads or the weather may impede transfer of the wounded.

4. A low number of injured in the presence of sufficient medical personnel and equipment may lead to preference for treatment on location over transfer of the wounded.

In contrast, the following reasons prevailed and prevail for preferring transfer of the wounded:

1. In the wars of the second half of the 19<sup>th</sup> century, the "decisive battle" started to separate into a series of more or less important encounters. The reasons may be sought mainly in the rapid increase of productive forces and technical means. Large armies were created on the basis of compulsory military service, new wide-range and rapid-fire weapons and new means of communication were introduced. In connection with the building of railroads a change occurred in the order of troop display and concentration. The maneuvering nature of military operations required that the medical installations immediately follow the fighting troops. This could be done only by emptying them of the injured (after applying first aid as far as possible) thus moving the latter.

2. A large number of injured, thus an uninterrupted stream of wounded and sick to the medical installations will require increased transfer.

3. The lack of conditions required for treatment of wounded and sick in the field and lack of sufficient means for transporting the injured may lead to preference of transfer instead of treatment on loca-

tion.

It should also be considered that both the size of the field of operations and its distance from the supply centers of the country may have a certain effect on whether preference is given to one or the other system in the organization of the medical service.

### 1.2.3. Characteristic Features of the Medical Service Under Modern Conditions

Organization of medical care and treatment of members of the armed forces in war includes all measures for protecting the health of the soldiers, for early treatment of the injured, for rapid restoration of their fighting capacity and return to the fighting forces.

Experience has convincingly shown that measures for health protection under war conditions and the activities of members of the medical service in war differ considerably from those effective in the medical treatment of a civilian population in peacetime.

The activities of the members of the medical service in wartime, military physicians, dentists, pharmacists, medical assistants, lower-rank sanitation officers and soldiers as well as nurses is determined by the following features:

first, the maneuvering character of modern fighting, the frequent, rapid, often sudden change in battle situations will require constant consideration in the organization of medical care for members of the armed forces and exert a decisive effect, for armed fight under present conditions has all the characteristics of a mobile war. Various parts of the armed forces participate in coordination, such as rocket units, motorized rifle troops, artillery, armored tanks, paratroopers, etc. The introduction of means of mass annihilation into the weaponry of modern armies and the full motorization of the army have considerably increased mobility of their parts and units, their ability to inflict

heavy blows on the enemy. These circumstances will have an essential effect on the activity of military physicians and their aides in the field. In peacetime a physician works under stable conditions; as army physician in wartime he must master highly complicated tasks under greatly varying conditions. He may have to change his place of work frequently, often several times daily if troops advance rapidly, are in defense or on the march; he must do his duty day and night under any climatic conditions and make critical decisions often involving life and health of members of the armed forces [31].

The second characteristic determining the organization of health protection of the armed forces in a future war is the sudden, surprising, simultaneously occurring incidence of injuries (caused by wounds, poisons, radiation, disease) and the developmental character of these injuries.

While grave accidents in peacetime or disasters caused by natural forces, earthquakes, floods, mine accidents or train collisions, may cause many injuries requiring rapid medical aid, neither frequency nor extent of such disasters compare with the effects caused by a war conducted with the means of mass annihilation. We may form an idea on the extent of losses to be sustained in a future nuclear war from the reports referring to the detonation of two nuclear bombs released by the Americans in August 1945 on the completely unarmed and defenseless Japanese cities Hiroshima and Nagasaki.

The third characteristic distinguishing medical activities in the field from those in peacetime are the differences in pathogenicity and clinical appearance of injuries sustained in armed fight [12]. Wound infections and shock, these dangerous complications of shot wounds, appear much more frequently in war than peacetime injuries. There is the additional fact that the means of mass annihilation introduced into ar-

my equipment in a future war may require provisions for the treatment of injuries and diseases which are unknown in peacetime practice and which require special treatment. These are the so-called combined injuries caused by the various forms of energy liberated by nuclear detonations: simultaneous wounds (directly by air pressure or secondarily by falling trees, parts of buildings, etc.) burns (by radiating heat) and radiation injuries (by radioactive irradiation). Considering that in a future nuclear war there will be no boundaries between the front-line and the hinterland, since fighting troops as well as every point in the hinterland will be exposed to nuclear attacks by the enemy, it must be concluded that both military as well as other physicians and their aides need a clear understanding of the causes, diagnosis and therapy of war injuries.

A fourth important characteristic of medical activities in the field is the fact that work is bound to be performed under primitive conditions. First aid stations, hospitals and ambulance transports will frequently be exposed to enemy attacks, for under modern warfare conditions there exists, basically, no safe place even in the hinterland. Under field conditions, there are no well equipped buildings, with running water, central heating and sewers. The military physicians and their assistants will have to perform their complex tasks in underground bunkers, trenches, basements, ruins and tents, frequently in the dark or under insufficient lighting; they will frequently have to watch the amount of water they use. Under such extraordinary circumstances, a large number of injured will have to be accepted, treated, fed and prepared for further transfer. If we consider that first aid stations and hospitals will have to change their location frequently in accordance with the fighting situation we can imagine the highly specific circumstances determining activities of the members of the medical ser-

vice assigned to army troops in wartime.

### 1.3. THE NATURE AND CONTENT OF MILITARY MEDICINE

The sum total of these specific features, the unusual work conditions for medical personnel in the field, constitute the scientific basis for all the prophylactic, diagnostic, therapeutic and organizational measures to be taken for health protection of the army in wartime. Study of these questions is the aim of the various branches of military medicine.

The concept of military medicine covers the various medical disciplines representing the scientific basis for health protection of the army in peace and war and for the prevention, diagnosis and therapy of war injuries. Military medicine may be divided into the following branches [11]:

1. Organization and tactic of medical service,
2. organization of health protection of the armed forces in peacetime,
3. military surgery,
4. military internal medicine,
5. military hygiene,
6. war epidemiology,
7. pathologic morphology of war traumas,
8. military physiology,
9. military health protection (radiology and toxicology),
10. military legal medicine,
11. military medical geograph,
12. medical equipment and supply,
13. history of military medicine.

All these divisions represent specific medical disciplines broadened to meet military conditions; in the course of time they have de-

veloped specific methods, and they show certain signs of independence. Thus war surgery as a branch of military medicine represents an extension of surgery while applying the methods of general surgery. Objects of this medical discipline are war injuries, the specific features of wound healing, the condition of the organism and its reaction to the damage. Field surgery also assumes the task of studying methods and organization for obtaining qualified surgical aid under battle conditions on the basis of the latest scientific knowledge and in consideration of the specific fighting situation. Military science and the various branches of military medicine are closely related, as may be seen [47].

The branch of military medicine called "organization and tactic of medical service" assumes a special position [22]. It may be compared to the medical disciplines of planning and organization of health protection or public hygiene, disciplines which represent the scientific basis for organizing public health and the work of the national health authorities.

Organization and tactic of medical service involves study of the basic rules governing the proper organization of medical care and treatment of the armed forces in accordance with the state of medical knowledge, that of the art of warfare and military technique. The development of all branches of military medicine is closely related to that of organization of tactic of medical service and vice versa [36].

We may thus draw the conclusion that qualifications for military physicians include, in addition to a thorough knowledge of medicine, organizational knowledge and abilities, to secure correct medical performance under difficult conditions in the field and the proper organization of medical treatment and care of the wounded and sick [17].

It may be seen from the above that the following factors influence

and determine the organization of medical service:

1. The level of social development of the country, i.e., the social system,
2. the state of military technique and equipment of armed forces,
3. the level of tactic and the art of operations, the forms of armed fight,
4. the state of medical knowledge and public health of the country,
5. the size of the field of operations and its distance of the country's supply centers.

## 2. TASKS AND ORGANIZATION OF THE MEDICAL SERVICE OF THE NATIONAL PEOPLE'S ARMY

The duties to be imposed on the Medical Service can only be determined on the basis of a thorough, scientific analysis of new developments in military science and extensive consideration of the specific features and possibilities of new weapons and the new fighting technique.

Socialist military doctrine is thus the starting point for determining these duties; it consists of uniform, fundamental guidelines on the character and aims of a possible war, preparation of the country for defense against imperialist aggression and the problems related to the buildup of the armed forces and their deployment in war.

Military doctrine is variable, for it depends on many factors, thus necessarily subject to constant review.

Under present political, economic and military world conditions, these fundamental guidelines have been expressed as follows (R. J. Malinowski, "Auf Friedenswacht," Moscow, 1962, Russian):

1. A future war, precipitated by trigger-happy imperialists, would represent the decisive armed clash between the two opposing social orders, the capitalist and the socialist system.

2. A future war between these two world-wide systems would necessarily have to be a nuclear war.

3. Such armed fight would be characterized by as yet unknown violence involving the deployment of all available forces and means, of armies numbering in the millions, considerable mobility and maneuver-

ability of the troops over wide areas and into deep spaces, the lack of compact stable fronts and of a sharp boundary between field of operations and the hinterland. Many ways would exist for executing surprise strikes of unimaginable force against both army and the remote hinterland; it would be possible to achieve decisive military results within a very short time over any distance and over large territories.

4. The initial period will be much more important than in earlier wars and may decisively affect both the course and the outcome of the war. Both sides would try to seize the initiative by striking heavy blows and decisively weakening the enemy.

5. In this bitter struggle victory will be achieved only by the combined efforts of all parts of the armed forces and all kinds of weapons.

## 2.1. THE SOCIALIST DOCTRINE OF MILITARY MEDICINE

These guidelines are the basis for the socialist doctrine of military medicine. This consists of basic guidelines related to extent and character of the losses to be expected, the medical provisions for national defense, the structure of the Medical Service and its deployment in war. These guidelines should agree with the socialist military doctrine and be based on a realistic evaluation of the political, economic and military situation in Germany.

The doctrine of military medicine as basis for the medical support of our national defense and the tasks to be performed by the Medical Service of the National People's Army may be briefly formulated as follows:

1. In the case of armed fight on German soil, no basic difference will exist between working conditions of the members of the Medical Service in the field and their coworkers in the civil health service of our Republic. This means that physicians, pharmacists and members

or related professions must have a certain knowledge of military medicine and be able to handle a massive influx of casualties under difficult conditions.

2. During the initial period which will have a decisive effect on the course and outcome of the war and in consideration of the probably short duration of a nuclear war, no more means will essentially be available in wartime than those provided for in peacetime to meet war requirements. Hence the conclusion that every hospital, every rural clinic, every polyclinic must be prepared in peacetime for national defense and dispose of sufficient medical equipment, instruments and drugs to cope with a massive influx of injured.

3. The forces and means of the Medical Service structurally designed for first aid would never be sufficient in a nuclear war; thus a large part of first aid administration would have to be delegated to laymen or the lower medical personnel. The activity of the medical staff will be restricted to routine performance. This will necessarily lower the quality of medical aid. Such basic considerations forcibly lead to the conclusion that selfhelp and mutual help will assume tremendous importance in a future war.

4. Medical care and treatment will be mainly organized on the principle of rapid operative deployment of mobile medical installations and units in those sections and areas where means of mass annihilation employed by the enemy have caused heavy losses; the principle of treatment on location will certainly prevail although, depending on operative conditions, this will not exclude the transfer of certain groups of injured to the hinterland.

5. Delimitation between the competence of the Medical Service of army units, that of the National People's Army as a whole and the civilian health service does not exclude the possibility of treating in-

dividuals injured on GDR territory at the nearest medical installation, be they members of the armed forces or civilians; later transfer to the installation to which they belong (military or civilian hospital) is a secondary task.

## 2.2. GENERAL DUTIES OF THE MEDICAL SERVICE

The general duties assumed in national defense by the Medical Service of the National People's Army consist essentially in the following:

1. To save the lives of the injured to the best of their ability; to obtain rapid healing of their wounds, restore their fighting capacity and return them to their army units.
2. Restore working capacity of the injured unable to return to active service and keep invalidation to a minimum.
3. Optimally inhibit development and spread of diseases in the armed forces.

These duties derive logically from the consistent attention given the well-being and health of our citizens by Germany's socialist unity party, the State Council and the Government, so characteristic for our socialist GDR.

If, based on military doctrine, we accept the assumption that a possible future nuclear war will last only a limited time we have to conclude that early medical care and treatment by specialists of the large influx of injured will play a primary role, that this part of medical care and treatment will have to assume the center of attention and that final cure and after-treatment will probably have to wait until after the war in the majority of cases.

This fact clearly shows that the revolution which took place these last years in modern military science, the introduction of new means of annihilation (nuclear weapons) and their far-reaching carriers (rockets) into the armed force equipment have caused important changes in

the ideas on the proper organization of medical care and treatment of the injured; these ideas show some fundamental differences compared to experience in past wars. We would remind the reader that during the first and second World Wars the numerical replenishment of units depleted in the course of the war was achieved mainly through return of the injured who had been restored to health; this task was assigned to a central state agency, and it could be done under the then prevailing military conditions. As mentioned earlier, this sector of medical care and treatment will be unable to play a similar role in a future nuclear war.

Obviously these considerations have to be taken into account in preparing for the medical support of national defense, improving the readiness for deployment of the army's Medical Service and the education of physicians and their aides.

Measures taken by the Medical Service for improving the health of the armed forces will directly improve the army's fighting capacity. A possible nuclear rocket war will strain physical and moral forces of the fighting individual to an as yet unknown degree. The health of soldiers, sergeants and officers, their resistance and ability to rapidly overcome difficulties in the field will be of utmost importance.

Of no lesser importance is the task assumed by the Medical Service of preventing the appearance and spread of diseases among the troops. While times are gone when losses from diseases, mainly infective diseases, exceeded those suffered in fight, we should consider that the use of nuclear, chemical and bacteriological weapons by the enemy may cause many diseases and infections unknown in earlier wars. We should also consider that in a nuclear war humans will have to live under extremely unfavorable conditions likely to reduce resistance of the organism and favor the appearance of various diseases. Thus even low ra-

radioactive doses may affect the natural immune properties of the organism and impair its resistance against harmful environmental effects.

### 2.3. SPECIFIC DUTIES

In the field, the army's Medical Service assumes the following specific duties:

#### 1. To induct healthy individuals into the armed forces:

The introduction of a constantly increasing number of new devices makes increasing demands on the physical, mental and moral forces of soldiers. In a nuclear war, fighting would be likely to erupt at any time of day or night and any weather. Only well trained, physically fit and healthy individuals will be able to man high-flying planes, drive armored tanks over considerable distances and handle rapid boats; only truly healthy people will be able to move 80, 100 or more km daily, alternately driving, marching, running, leaping and crawling. Screening of the able-bodied citizens for army service to provide the army with truly healthy, capable individuals belongs among the tasks of the Medical Service and directly affects the fighting capacity of the armed forces.

#### 2. Medical treatment, i.e., therapeutic activities, assumes first place among the duties with respect to the amount of work. This represents the sum total of measures directed towards early first aid and subsequent medical and special treatment of the injured in connection with their transfer.

In this connection, we would stress a specific feature of modern medical army practice. The characteristic conditions of modern armed hostilities, the nature and massive appearance of war injuries require that first aid for the injured and sick be combined with their transfer, something which does not occur in peacetime practice. One of the greatest accomplishments of modern military medicine is the recognition of

the fundamental relationship between therapy and transfer and the development of the proper methods for organizing this link. The realization that transfer of the injured is a medical task and must be directed by military physicians has only come about in the last decades.

Two main requirements must be met in organizing for the transfer of the wounded and sick; transfer according to medical indications and provision for uninterrupted maneuverability of the troop's mobile medical installations. The first aid stations thus have to be emptied of accumulating injured with optimal rapidity to be able to follow the fighting troop and do their work (see 4.1).

### 3. Sanitary-hygienic and antiepidemic measures:

The sanitary-hygienic measures involve medical monitoring of the state of health and physical development of members of the armed forces, medical supervision of food, water supply, shelter, the soldiers' living habits, etc.

Antiepidemic measures involve recognition and extinction of infective foci, isolation and stationary treatment of patients with infective diseases and quarantine.

Hygienic, sanitary and antiepidemic measures are closely related; they are directed towards maintaining health and preventing disease in the army.

Under present conditions, the role of sanitary-hygienic and antiepidemic measures has gained more importance, in consideration of the possible use of bacteriological weapons by the enemy (see 5.1).

4. By "medical protection" we mean those tasks of the Medical Service directed towards preventing injuries due to nuclear detonations, radioactive substances and chemical weapons and first aid for these injuries or poisonings. It also involves examination and surveillance of possibly contaminated food products and water and the protection of

medical transfer stations against radiation and chemicals.

5. Provisions for medical equipment, dressings and drugs involves planning and storage of sanitation equipment, constantly used medical materials and supplies, their distribution to the army units and medical installations. Military pharmacists are charged with directing this service for medical provisions (see 7.3).

6. Medical intelligence is charged with collecting data on the factors affecting the state of health, hygienic and sanitary conditions of the troops and working conditions for the members of the Medical Service. According to the particular aim, medical intelligence may assume a medical-tactical, sanitary-hygienic, epidemiological, radiological or chemical character (see 6.2).

7. Sanitary education of all soldiers, sergeants and officers aims at instructing the members of the armed forces in the use of personal items for first aid (dressings, medical protective package), in the methods of self- and mutual-help in injury and protective measures against injuries and disease. Such instruction aims at decreasing morbidity and mortality in the field.

8. Military medical statistics (verification and reporting) constitutes an important means for directing the Medical Service. It advises on the number of injured, the nature of the injuries and their course. It also reports on the network and performance of the medical installations, thus affords the proper and early deployment of the medical forces and means.

#### 2.4. THE FORCES AND MEANS OF THE MEDICAL SERVICE

The above-listed duties of the Medical Service determine its organization.

Medical Service units are attached to the army units and are primarily responsible for first aid, medical treatment and transfer of the

injured. The units of the Medical Service consist of battalion ambulance trains and the ambulance unit of the regiment. These are not economically independent units, carry no troop flag or other specific sign; their identification is the same as that of the troop part to which they belong.

The designation "Troop Part of the Medical Service" applies to formations of the Medical Service which have all the characteristic features of an independent troop part such as identification number, independent accounting, etc. Their primary duty consists in medical and special medical treatment and transfer of the injured, and organization and execution of sanitary-hygienic and antiepidemic measures. The troop parts of the Medical Service include the Med.-San. Battalion of the Division, the sanitary transportation company of the army, etc.

The units and troop parts of the Medical Service are completely motorized, thus highly mobile and can start work at any location.

Field and reserve hospitals are designated as "Installations of the Medical Service." They are usually grouped under one command. Their task consists in the special treatment and restoration to health of the injured.

The companies' sanitation personnel and the sanitation trains of battalions together with the sanitation company of the regiment represent the "Medical Service of the Regiment" headed by the regiment physician. The latter is responsible for early deployment of the forces and means of the Regiment's Medical Service; he is directly subordinate to the commander of the regiment and superordinate to the director of the regimental first aid station set up by the sanitation company.

The forces and means of the Regiment's Medical Service and the Med.-San. Battalion whose Medical Company has to set up the first aid station of the Division form the Medical Service of the Division.

The "Forces of the Medical Service" consist of the officers, non-commissioned officers and civilian workers of the Medical Service; their qualifications vary according to their duties. Physicians constitute their most important group. The troop's physicians should qualify as "practitioners;" the Med.-San. Battalion must include surgeons, internists, hygienists and epidemiologists.

Physicians, dentists, pharmacists and feldshers have officers' ranks and rights and duties pertaining to these ranks.

The "Means of the Medical Service" constitute the material basis for performance of its tasks. These include field sanitation equipment (drugs, dressings, instruments, tools, pharmaceutical accessories, etc.) vehicles for transportation, trucks, shower and disinfection installations, stocks of laundry and clothing, food, tents, stretchers, gas masks and protective clothing for the injured, camouflage, entrenching equipment, etc. Provision for a continuous supply of sufficient material-technical means and medical equipment for the units, troop parts and installations of the Medical Service belongs among the important duties of the forces responsible for Medical Care (pharmacists, specially trained feldshers); this is after all the duty of all superior ranking medical officers.

### 3. MEDICAL CASUALTIES IN WAR

The extent and character of medical casualties determines to a high degree the amount of work, its organization and the working methods in the units, troop parts and installations of the Medical Service. Without an approximate idea on losses to be expected in a battle no successful performance can be expected of the Medical Service of troop parts and divisions.

Each fight, each military operation, each battle, every war is accompanied by losses in men. Total losses may be divided into two categories:

1. Absolute, nonrecuperable losses: these include soldiers killed in battle, service-connected deaths, the captured and missing,
2. medical casualties: these include the injured and sick, i.e., those unfit for frontline service for at least 24 hours who have to be taken to a first aid station of a medical installation.

Medical losses thus consist of two categories: the injured and the sick.

#### 3.1. CLASSIFICATION AND EXTENT

The injured may be classified according to various points of reference, e.g., the kind of weapon which caused the injury, the nature or severity of the injury and the kind of transportation required.

1. Classification according to the weapon which caused the injury will obtain the following groups:

- a) injuries caused by conventional arms such as firearms, grenades, bombs, mines, etc.

b) injuries inflicted by nuclear weapons and radioactive substances,

c) injuries due to exposure to chemical weapons,

d) injuries caused by bacteriological weapons.

2. According to the character of the injury, medical casualties may be grouped as follows:

a) penetrating injuries (shot, stab, slash and shell fragment wounds),

b) superficial injuries (open or closed, contusions, burns, frost-bite),

c) radiation injuries,

d) poisoning,

e) infection (contamination),

f) illness.

3. Depending on the severity of the injury, the injured may be grouped into minor and major. The first group consists of those who are not dangerously injured or sick and require short and simple treatment; patients requiring probably no more than 1-2 months of treatment are counted among the minor casualties.

The term severe injuries is applied to patients with dangerous wounds, poisoning or radiation injury which cause functional disturbances in the organism and may result in lasting disability for front service.

4. According to the way in which the injured are removed from the field of operation and transferred for early treatment (kind and means of transportation), they may be divided into the following groups:

within the area covered by the company and battalion at the front line where the injury occurred into:

a) those who are able to walk and reach the next first aid station

on foot without help (usually 30-40% of all medical casualties),

b) those who must be transported on stretchers.

For transportation in ambulance vehicles, trucks, bus or airplane, the injured are grouped into

a) those who can sit up,

b) those who have to be transported lying down

c) nontransportables (injured in whom transfer from the division's first aid station to medical installations behind the lines is counter-indicated because of their serious condition).

We would mention in this connection that under present combat conditions there can be no nontransportable injured at the regiment's dressing station; all the injured must be sent from there to the division's dressing station or to a field hospital (see 10.2).

5. Medical grading of the injured requires yet another kind of subdivision into two groups:

a) patients who constitute a danger for their environment (this includes infection, radioactive contamination and poisoning by stable chemical weapons; these require immediate consolidation into groups and isolation),

b) patients constituting no danger for their surroundings.

Grouping of the injured who arrive at the division's dressing station into these last two categories constitutes the basis for further grading of the injured and sick, for properly steering the stream of injured and for avoiding additional harm.

The extent of overall casualties depends on various factors. The nature of the hostilities, the kind of weapons deployed, the soldiers' morale and battle experience, their commander's military ability, troop equipment, readiness of the Medical Service, season and weather will exert their effect on the casualty list.

The director of the Medical Service on that location cannot make a correct estimate on the probable extent of casualties in advance of the battle without full knowledge of all the factors determining extent and character of these casualties. Only in possession of this knowledge will he be able to correctly organize the Medical Service within the district in his charge and properly deploy forces and means of the Medical Service.

### 3.2. MEDICAL CASUALTIES THROUGH FIREARMS

The large majority of medical casualties in the wars of the 19<sup>th</sup> and 20<sup>th</sup> century was caused by firearms. Despite the development of means for mass annihilation, firearms have retained their importance; they are part of the equipment of infantry, artillery, armored tanks, airborne forces and air defense. There is no doubt that they will play an important role even in a possible nuclear war.

The following specific firearms belong to the equipment of modern armies: automatic pistols, machine guns, artillery guns, grenade throwers, mines, artillery rockets and airborne bombs.

Harmful factors of firearms are:

a) the projectiles of automatic weapons (automatic rifles, machine guns) and the fragments from artillery projectiles, mines and airborne bombs; they cause wounds.

b) the pressure wave accompanying detonation of artillery projectiles, mines and bombs; this may provoke internal wounds, injuries of the central or peripheral nervous system, the organs of perception, etc.

As a result of progressive development and refinement of artillery weapons in the last hundred years, the frequency of wounds caused by shell fragments has considerably increased. The wounds caused by the fragments also became larger, and the healing process, often accompan-

ied by complications, took longer. While in the first World War about 50% of all wounds inflicted by firearms were caused by shell fragments, this figure had increased to 61% in World War II, and multiple injuries also occurred more frequently.

The severity of shot wounds is also determined by the site of the lesion. Certain experimental values were determined in the last war. The frequency rate of lesions has been rather constant for the various parts of the body. Such knowledge is important for chiefs of the Medical Service at the various levels, for they indicate requirements for special forces and means. The distribution of injuries caused by conventional weapons over the body parts is proportional to the dimensions of these parts; the larger the body part the more probable its injury. The fighter's posture at the time of injury also determines the frequency of the specific body injury [57].

Body Part	Frequency of Injury (%)
head	7.0...13.0
neck	0.5...1.5
breast	7.0...12.0
abdomen	1.9...5.0
hip	5.0...7.0
spine	0.3...1.5
upper extremities	29.0...45.0
lower extremities	30.0...40.0

The above table shows that injuries of the limbs may account for about 2/3 of the injuries caused by firearms. It should be noted that the left part of the body is more frequently hit than the right, the left arm almost double as often as the right, the left leg almost 1½ times as often as the right. As with boxers who hit from the left, shooting soldiers who advance after leaving cover will usually expose

the left side of the body which acts as a kind of cover for the right side.

That deep shot wounds which injure the bone (shot fractures) represent a complication need not be mentioned specifically. It has been found that 30-40% of all shot wounds are accompanied by bone injury [12].

The healing process of shot wounds differs considerably from that of injuries seen in peacetime. All shot wounds should essentially be considered serious injuries. They require early intensive treatment and should as a rule be treated by specialists: head injuries by the neurosurgeon, otolaryngologist, stomatologist or ophthalmologist; deep breast and abdominal injuries require a thoracic surgeon and those of the supporting and motor apparatus a traumatologist or orthopedist.

On the basis of experience gained in the last wars and our ideas on modern combat in a nuclear war, we would estimate that in the initial period of such a war 5-6% or more of the regimental forces would be injured by firearms per battle day. Depending on the fighting situation, these figures may increase during active fighting and considerably decrease in periods between operations; the division's physician will have to count with 3-5% medical casualties caused by the enemy's firearms under unchanged conditions. The casualty figure will naturally vary after days of combat and also for the individual days of operation.

### 3.3. MEDICAL CASUALTIES FROM NUCLEAR WEAPONS

In a possible nuclear war, medical casualties caused by nuclear weapons will considerably exceed those by conventional arms.

Explosive nuclear arms are at present the most powerful means of annihilation, and their destructive effect is hard to imagine; nuclear warheads can be built into bombs, artillery projectiles, rockets and torpedoes.

The explosive power of nuclear charges is expressed by the trotyl equivalent, abbreviated TNT equivalent; this represents the amount of the well-known chemical explosive trinitrotoluene, called trotyl or TNT, chemical formula  $C_6H_2(NO_2)_3(CH_3)$ , whose chemical explosive energy corresponds to that of a given nuclear charge.

Present known nuclear weapons have a TNT equivalent of several 1000 to several 100,000 tons. Multiphasic nuclear weapons possess even higher explosive force; their TNT equivalent is measured in million tons. A rough idea on the effect of these mass annihilation devices may be derived from the data given by the Minister of Defense of the SSSR, R.J. Malinovski [46]: "Scientists have calculated that the explosion of a medium-sized hydrogen bomb in a large, densely populated industrial area could kill 1.5 million people in one strike and that another 400,000 would subsequently die from the effect of radiation. A single bomb of this kind would thus be sufficient for leveling a large town. English scientists concluded that 4 megaton bombs on London, Birmingham, Lancashire and Yorkshire would kill at least 20 million people. According to other calculations, no more than 8 thermonuclear charges with an explosive force of 3-5 megatons could put all of Western Germany out of fight. The well-known American scientist Linus Pauling said: about a billion people live in areas which would probably be exposed to the most powerful nuclear strikes; within 60 days after a nuclear strike 500 to 750 million people would have died.

The continuing development of science and technique has resulted in the creation of oversized thermonuclear charges.

Detonation of such a single charge would make a desert out of a 10,000 km<sup>2</sup> area. Populations of countries not exposed to direct strikes would also suffer unimaginable torture and misery in a thermonuclear war. Dozens of millions of these countries' populations would die due

to contamination of soil, water, air and food.

These data should suffice to show that the thermonuclear war being prepared by the imperialists would be the most terrible crime committed against mankind."

Nuclear weapons are now usually classified according to their TNT equivalent

as small caliber for up to 15,000 tons

medium caliber from 15,000 to 100,000 tons

heavy caliber for over 100,000 tons.

Nuclear charges may be detonated:

1. in the air, a few hundred meters above ground or water (air detonation)
2. on the ground (ground detonation)
3. underground or underwater (underground or underwater detonation).

Depending on the kind of detonation (air, ground or underground), the percentage assumed by the various destructive factors will vary; thus an air detonation at 600 m above ground will liberate the following proportional energies [59]:

40-50% for the pressure wave,

30-40% for thermal radiation,

4-5% for immediate nuclear radiation,

10-15% for residual nuclear radiation (radioactive fallout).

In a detonation on the ground the share of pressure wave and thermal radiation will decrease in favor of nuclear radiation and fallout; contamination of the land is much higher than in an air detonation of the same yield.

At the time of a nuclear detonation in the air, bright blinding lightning will appear accompanied by a deafening noise resembling thunder. Immediately after the lightning, a huge fireball will develop per-

sisting for several seconds at the detonation site; temperatures in its interior reach several million degrees Celsius. The fireball rapidly ascends and, since it has cooled off and sucked a pillar of dust and smoke from the ground, it will turn into a characteristically mushroom-like cloud. This cloud which contains radioactive substances again climbs 5-20 km within a few minutes, depending on the nuclear caliber and meteorological conditions. It is then carried away by the wind and dispersed to slowly descend to the ground.

Four harmful factors accompany the detonation of a nuclear charge:

1. pressure wave,
2. thermal radiation,
3. immediate nuclear radiation,
4. fallout.

#### 3.3.1. Pressure Wave

The major part of the energy liberated by nuclear explosions initially turns into heat. The sudden heating of the entire bomb substance (grenade, rocket, etc.) causes appearance of the above-mentioned fireball. Temperatures of several million degrees induce a glow in the surrounding medium; the thus developing gases expand rapidly under overpressure. Compression of the surrounding air causes a thrust of dense air which propagates wave-like at a rate exceeding that of sound. When viewed from an observation point this thrust of compressed air — the pressure wave — consists of two periods: that of a pressure exceeding atmospheric pressure, and another low-pressure period (suction towards the explosion center) below the atmospheric pressure. The initial high velocity of the pressure wave decelerates after 1 km to that of sound traveling 3.7 km in 10 seconds.

Thus, at a 2 km distance from the detonation center (called epicenter), 3 seconds are left after the appearance of the fireball to

seek cover from the effects of the pressure wave.

In the detonation of conventional explosive charges the pressure close to the explosion site will exert its effect for 0.01 sec, in a nuclear small caliber detonation for 1 sec, in that of a multiphasic nuclear charge as long as 10 sec; thereafter the pressure has the effect of a thrust rather than a blast. Even 1 and 2 have a lethal effect at overpressure. In unprotected individuals the pressure wave may cause the following injuries [59]:

1.0 kgf/cm <sup>2</sup>	lethal effect
0.6-0.8 kgf/cm <sup>2</sup>	severe injuries
0.3-0.4 kgf/cm <sup>2</sup>	moderately severe injuries
0.2-0.3 kgf/cm <sup>2</sup>	minor injuries (usually causing no loss of fighting capacity).

These injuries are caused by two factors: the compressed air thrust exerts a sudden, unilateral pressure on the human body, creating a pressure wave which rapidly propagates through tissues and organs and may lead to their destruction. The greatest damage appears in organs filled with air, gas or fluids (lungs, intestines, liver, spleen, gall bladder, urinary bladder, etc.).

The individual may also be hit by objects lighter than his body which are carried along by the wave (fragments from buildings, rocks, etc.) or he himself may be hurled off his feet. Contusions, sprains, fractures or brain concussion may be the result.

The harmful effect of the pressure wave depends on the distance from the epicenter, on whether the individual had some protection or was exposed without cover to the pressure wave.

The following table [59] shows the relationship between pressure effect and distance from the epicenter (in unprotected individuals):

1 Verletzungsgrad	2 Druck [kp/cm <sup>2</sup> ]	3 Kaliber [kt TNT]					
		20	50	100	20	50	100
		4 Entfernung vom Epizentrum [km]					
		5 Luftdetonation			6 Erddetonation		
7 tödlich	1,0	0,65	0,9	1,1	0,7	0,95	1,2
8 schwer	0,6	1,2	1,6	2,0	0,95	1,2	1,5
9 mittel	0,35	1,6	2,1	2,9	1,2	1,7	2,1
10 leicht	0,2	2,4	3,2	4,1	1,8	2,4	3,1

1) Grade of injury; 2) pressure; 3) caliber (kilotons TNT); 4) distance from the epicenter (km); 5) air detonation; 6) ground detonation; 7) lethal; 8) severe; 9) moderate; 10) minor.

It may be seen from this Table that air detonation of a 20 kiloton nuclear charge will cause a pressure wave exerting its lethal effect within about 600 m of the epicenter but causing only minor injuries in an individual at a 2.5 km distance.

### 3.3.2. Thermal Radiation

Intensity and duration of the radiation of light depend on the caliber of the nuclear charge and meteorological conditions.

For small-caliber weapons (10-20 kilotons TNT) it will persist for 1-3 sec, for large weapons whose explosive energy is counted in megatons (1 megaton =  $10^6$  tons) it may last up to 20 sec. The source of thermal radiation is the above-described fireball with an internal temperature of several million degrees. Such radiation resembles sunlight but is many times brighter; the heat effect derives mainly from the visible part of the light spectrum. Fog, rain and snow will obviously decrease the distance within which the light can exert its effect and the effect itself. We need hardly mention that the share of thermal radiation is much lower in ground explosions and constitutes only a negligible part of the energy liberated in underground or underwater detonations.

The following heat intensities represent critical values for the effect of thermal radiation on uncovered parts of the body over 0.3-0.5

seconds:

30 cal/cm <sup>2</sup>	lethal
10-20 cal/cm <sup>2</sup>	3rd degree burns
5-10 cal/cm <sup>2</sup>	2nd degree burns
2-5 cal/cm <sup>2</sup>	1st degree burns.

The following table [64] shows the injuries inflicted by thermal radiation from a nuclear charge (air detonation) depending on the caliber and the distance from the epicenter.

Radiant heat can have a direct and indirect effect (flame effect from burning objects). Its direct effect results in burns called "profile burns" due to the straight path of light, i.e., affecting only the side turned towards the light source, at most 50% of the body.

1 Grad der Verbrennung	2 Strahlungs- intensität $\left[ \frac{\text{cal}}{\text{cm}^2} \right]$	3 Kaliber (kt TNT)			
		20	50	100	200
		4 Entfernung vom Epizentrum (Luftdetonation) (km)			
5 Verkohlung unbedeck- ter, Verbrennung 3. Gra- des bedeckter Teile	30	1,3	1,9	2,7	3,7
6 Verbrennung 3. Grades unbedeckter, 2. Grades bedeckter Körperteile	10	2,1	3,2	4,5	5,8
7 Verbrennung 2. Grades unbedeckter Teile	5	2,9	3,7	5,8	8,0
8 Verbrennung 1. Grades unbedeckter Teile	2	4,5	6,5	8,5	12,0

1) Grade of burn; 2) radiation intensity [cal/cm<sup>2</sup>] 3) caliber (kilotons TNT); 4) distance from the epicenter (air detonation [km]); 5) charring of uncovered, 3rd degree burns on covered body parts; 6) 3rd degree burns of uncovered, 2nd degree of covered body parts; 7) 2nd degree burns of uncovered parts; 8) 1st degree burns of uncovered parts.

Clothing, particularly light-colored clothes reduce the damaging effect of radiation. So-called contact burns will appear particularly in places where the clothing adheres closely to the skin (elbows, knees, shoulders and hips), since heat conduction is involved; clothes worn at a 5 mm distance from the skin will provide five-fold protection

against thermal radiation, for the isolating air layer inhibits heat conduction thus leaving only the radiant heat effect.

All objects providing shade will obviously also shield against the harmful effect of thermal radiation, objects such as bunkers, shelters, trenches, young forest and underbrush.

### 3.3.3. Immediate Nuclear Radiation

The harmful effect of immediate nuclear radiation consists in the ionizing effect of gamma particles and neutrons emitted in nuclear reactions. Gamma particles are electromagnetic waves with short wavelength, long range and high penetrability; they travel at the speed of light. The effect from gamma radiation emitted in detonation of a nuclear weapon lasts no more than 10-15 seconds. The neutron stream consists of nuclear particles carrying no electric charge, the neutrons, and its effect lasts only fractions of a second.

The danger of immediate nuclear radiation lies in its ability to penetrate various media such as the tissues of the living organism. It causes ionization, i.e., changes in the electron shells of the atoms; these change from the neutral to an electrically active state, thus become positively or negatively charged. They thereby induce the appearance of substances with completely new properties in the tissues; unusual reactions will occur and disturb the physiological processes of the organism.

The neutron stream leads to artificial radioactivity; the free neutrons are "caught" by stable atomic nuclei, and new nuclei carrying high energies are created. These discharge their excess energy either as gamma rays or transmit part of this energy to stable nuclei which they thereby excite, again inducing gamma ray emission.

Due to its ionizing properties immediate nuclear radiation may cause radiation sickness in the human organism. The severity of radia-

tion sickness is determined by the dose of such nuclear radiation which is expressed in roentgen (r).

The dose of 1 r represents electromagnetic (x-ray or gamm) radiation which creates  $1.6 \cdot 10^{12}$  pairs of ions in 1 g normal air, losing  $83.7 \cdot 10^{-7}$  watt seconds energy in the process.

The following Table shows dose values and their effect for short-term full body irradiation of man by gamma rays [59]:

25 r	critical dose up to which no clinical injury is usually seen
25-100 r	lymphopenia and other mild symptoms (nausea, fatigue, vomiting)
150 r	radiation sickness in about 50% of those exposed
200 r	depression of blood components; about 5% mortality
225 r	radiation sickness in all the injured
400 r	severe radiation sickness, 50% mortality within 30 days
over 600 r	100% mortality

This table, in connection with the dose registered on a dosimeter worn on the person will permit an estimate of the probable injury.

The effect of immediate nuclear radiation depends, like that of pressure wave and light radiation, on the caliber of the nuclear charge and the distance from the detonation center; the value of the gamma-ray dose is inversely proportional to the square of the distance. At a, e.g., 5-fold increase in distance, radiation will decrease to 1/25; in other words, at a 5 km distance, the radiation effect is 1/25 of that exerted at a 1 km distance from the detonation center. Gamma rays will also lose some of their effect upon traveling through various media, e.g., a 14 cm layer of firmly packed soil will reduce the radiation

dose to 1/2, one of 60 cm to 1/10.

This shows that covered trenches, underground shelters and walls afford some protection from an immediate radiation effect.

The extent of danger incurred, depending on the caliber of the nuclear charge and the distance from the epicenter, may be seen from the following Table:

1 Strahlungswirkung	2 Dosis [r]	3 Kaliber [kt TNT]			
		20	50	100	200
		4 Entfernung vom Epizentrum [km]			
5 100 % Letalität	600	1,0	1,1	1,4	1,8
6 50 % Letalität innerhalb 30 Tagen	400	1,1	1,3	1,6	1,9
7 Müdigkeit, Erbrechen	75	1,4	1,3	1,6	1,9
8 keine klinisch erkennbaren Schäden	25	1,8	2,1	2,25	2,5

1) Radiation effect; 2) dose [r]; 3) caliber [in kiloton TNT]; 4) distance from the epicenter [km]; 5) 100% mortality; 6) 50% mortality within 30 days; 7) fatigue, vomiting; 8) no clinical signs.

The table shows that individuals exposed without protection to the effect of a 20 kiloton nuclear explosion may suffer lethal injuries at a 1 km distance, but are beyond the reach of harmful immediate radiation at a 1.8 km distance.

#### 3.3.4. Residual Nuclear Radiation

Residual nuclear radiation constitutes the fourth harmful factor of a nuclear explosion.

This represents the total radioactivity liberated by the explosion after more than one minute. This derives from radioactive fission products, the interaction between free neutrons and the atoms hit and from the decay of  $U^{235}$  or  $Pu^{239}$  not split during the explosion.

While the main mass of radioactive fission products from an aerial explosion will be thrust upwards with the above described cloud and carried away by the wind, a large part of such substances from a ground explosion will be mixed with the soil, dispersed by the pressure wave and carried along with the air currents. This results in serious contam-

ination of the land within the detonation area and along the path taken by the radioactive cloud.

The radioactive fission products emit gamma, beta and alpha rays.

We explained the nature of gamma radiation in connection with immediate radiation. Alpha and beta rays have much less penetrability but a higher ionization effect than gamma rays.

The alpha particles penetrate only a few cm in the air, beta up to 10 meter. A sheet of paper can absorb alpha particles; they are thus unimportant for the immediate radiation effect. However, they are very dangerous upon incorporation of radioactive fallout.

Alpha particles reaching the skin will practically stop there, since they penetrate no more than 0.05 mm; beta particles are able to penetrate a few mm into the organism and may cause skin injury, from reddening to necrosis.

This means that clothing alone affords complete protection against alpha and considerable protection against beta particles.

Much more dangerous is what we call incorporation, i.e., the uptake of radioactive substances by the organism itself. Incorporation may occur in several ways: by the respiratory tract through inhaling radioactive dust; by the digestive tract through contaminated food, water or the ingestion of food derived from animals or plants which incorporated radioactive particles. Wounds may also take up radioactive matter. In all these cases, mucosal inflammations, necrosis, severe injury to internal organs or radiation sickness may occur.

The degree of contamination is measured in roentgen per hour (r/h); an area is considered radioactive starting with a 0.5 r/h contamination.

### 3.3.5. Combined Injuries

It may be seen from the above explanations that nuclear weapons,

at present the most potent means of mass annihilation, can cause various kinds of injuries: open wounds or internal traumas, burns and radiation sickness. Medical casualties caused by nuclear weapons are characterized by the following: they appear suddenly, simultaneously, in fractions of a second, are complex in the majority of cases, due to the multiple factors which exert their effect in a nuclear explosion, and are called "combined injuries."

It is assumed that in a nuclear missile war 50-60% of medical casualties would be caused by nuclear weapons; the share of injuries from nuclear strikes out of the total medical casualties may amount to:

combined injuries	65-70%
radiation injuries	15-25%
burns	15-20%
trauma	to 5%.

Considering the effective factors, combined injuries may be expected to assume the following structure:

Trauma + burns + radiation injury	to 20%
burns + radiation injury	to 40%
trauma + radiation injury	to 5%
trauma + burns	to 5%

It is of course understood that extent and structure of medical casualties in a nuclear strike will depend on the caliber of the nuclear charge, kind of detonation, nature of the countryside, the meteorological conditions and particularly efficiency of protection and the possibility to take cover.

The following Table shows the extent of damage expected from the detonation of a 20 kiloton (kt) nuclear weapon [27]:

The table shows that in such a case individuals are exposed to 3 harmful factors at a 2 km distance, to 2 such factors at a 3 km dis-

1 Entfernung vom Epizentrum (km)	2 schädigende Faktoren		
	3 Druckwelle	4 Lichtstrahlung	5 Sofort- Kernstrahlung
0,8	6 Zerstörung von Gebäuden, schwere Verletzungen bei Menschen außerhalb von Deckungen	7 Entzündung, Verkoklung brennbarer Materialien, lebensgefährliche Brandwunden	8 lebensgefährliche Wirkung auf Menschen außerhalb von Deckungen
1,6	9 teilweise Zerstörung von Gebäuden, mittelschwere Verletzungen	10 Brände, Verbrennungen 2. und 3. Grades unbedeckter Körperteile	11 schädliche, z.T. auch lebensgefährliche Wirkung auf Menschen außerhalb von Deckungen
2,4	12 Beschädigung von Gebäuden, Zerstörung leichter Gebäude, leichte Verletzungen	13 einzelne Brände, Verbrennungen 1. und 2. Grades	14 schädliche Wirkung auf ungedeckte Menschen im Umkreis bis zu 2 km
3,2	15 leichte Gebäudeschäden, keine Verletzungen bei Menschen	16 geringfügige Verbrennungen an unbedeckten Körperteilen	-

1) Distance from the epicenter [km]; 2) damaging factors; 3) pressure wave; 4) thermal radiation; 5) immediate nuclear radiation; 6) destruction of buildings, serious injury to nonsheltered humans; 7) inflammation, combustion of flammable material, dangerous burns; 8) effect dangerous to nonsheltered humans; 9) partial destruction of buildings, moderately severe injuries; 10) fires, 2nd and 3rd degree burns on unprotected parts of the body; 11) harmful, occasionally dangerous effect on nonsheltered individuals; 12) damage to buildings, destruction of less solid structures, minor injuries; 13) isolated fires, 1st and 2nd degree burns; 14) harmful effect on nonsheltered individuals within a 2 km radius; 15) minor damage to buildings, no human injuries; 16) minor burns on unprotected parts of the body.

tance from the epicenter.

The multiple nature of the injuries caused by nuclear detonations which tends to complicate the healing process and lengthen the course of radiation sickness calls for the requirement that all physicians and their aides become familiar with diagnosis first aid and classification of combined injuries [42].

### 3.4. MEDICAL CASUALTIES FROM CHEMICAL WEAPONS

Sizable production of chemical weapons in the imperialistic countries affords the conclusion that these means of mass annihilation will play an important role in possible future hostilities. They are

poisonous for the human organism and may be deployed in the field for the massive annihilation of vital forces. Many such compounds have been created in liquid or vapor form, for use in combat as fog or smoke [44].

The known chemical poisons may be classified according to various points of view:

1. According to the predominant physiologic effect, or organ injury into
  - a) irritants (eyes, nose, pharynx),
  - b) compounds injurious to the lungs (e.g., phosgene),
  - c) those injurious to the skin (e.g., Yperit, Lewisit),
  - d) systemic and nerve poisons (e.g., hydrogen cyanide, Sarin, soman),
  - e) psychotoxic substances [45];
2. According to the speed of their effect into
  - a) rapid-acting chemical weapons (e.g., nerve poisons),
  - b) those with a delayed effect;
3. According to the period during which they retain their toxicity into
  - a) volatile, unstable chemical weapons (e.g., phosgene, hydrogen cyanide),
  - b) persistent, stable (e.g., Sarin, Soman, Yperit, Lewisit).

According to present assumptions, only the compounds listed under 1 are likely to be used in a war where chemical weapons are deployed; these are the organic phosphates Sarin and Soman, hydrogen cyanide, Yperit, Lewisit and phosgene. Their number may be reduced if we consider that about one half of U.S. production capacity for chemical weapons is taken up by Sarin and Soman.

War poisons may be carried into the enemy's lines by bombs, artillery projectiles, mines or rockets. It is characteristic of chemical

weapons that they can penetrate fortifications, protective covers, underground shelters, trenches and combat vehicles and injure people in locations where they are safe from firearms or even explosive nuclear weapons. Only if the underground bunkers can be hermetically sealed and provided with filtering and ventilatory equipment will they give sufficient protection against the poisonous aerosols. The fact that some of these chemical weapons are colorless and inodorous represents an additional danger, for this renders determination and diagnosis more difficult. The chemicals may enter the body by way of the respiratory organs, the digestive tract, the skin (wounds!) and injure the skin, internal organs or the central nervous system.

The extent of medical casualties caused by chemical weapons depends on the following factors:

1. Early intelligence in regard to the enemy's intention of attacking in a certain sector with chemical weapons,
2. Early identification of the chemical weapon deployed by the enemy and rapid diagnosis,
3. Disciplined and proper conduct of the fighting men (executing combat commands while wearing gas mask and protective clothing),
4. Early first aid; self-help or mutual aid will frequently be required, as, e.g., when organophosphates (Sarin, Soman) are used where only immediate injection of an antidote from the first aid kit carried by the soldier will save a life.

Deployment of chemical weapons will complicate the work of the Medical Service; sudden and considerable medical casualties within a restricted area, combined injuries, injuries dangerous on contact, these require special operative conditions at transfer points and first aid stations. The different incubation periods, varying from a few seconds to several hours, and contamination of the environment, arms and other

objects, food and water tend further to complicate the measures to be taken by the Medical Service.

#### 3.4.1. Medical Casualties Caused by Flammable Devices

"Flammable devices" are chemical compounds or mixtures which create high temperature upon burning. Such flammable mixtures were used in the 2nd World War by the American imperialists in aerial attacks on German cities and deployed in the war which they instigated against the Korean People's Republic.

Flammable mixture may be carried to their target in aerial bombs, artillery shells, rockets or mines or applied with flame throwers in close combat. One such flammable substance used by the Americans is Napalm, a mixture of a petroleum product (benzene) with the salt of a fatty acid (palmitic or stearic acid). This mixture will burn at a temperature of 800-1000°C; this temperature may be raised to 2500-3000°C [41] by the addition of metals.

Ignited flammable substances are hard to extinguish and cause extensive and very severe burns.

It is probably safe to assume that a future war will produce casualties from burns numerically a multiple of those suffered in past wars; it is assumed that casualties from burns only or combined injuries caused by thermal radiation from nuclear detonations and the use of flammable devices may reach 30-40% of total medical casualties.

It is understood that this consideration should be reflected in the education and advanced instruction of physicians and other medical personnel, in the equipment of first aid stations and other medical facilities and the stock of drugs and dressings.

#### 3.5. MEDICAL CASUALTIES FROM BACTERIOLOGICAL WEAPONS

In their attempt at creating new and increasingly effective means of mass destruction, the aggressive-minded groups of imperialist coun-

tries have included bacteriological weapons among their arsenal of those for massive annihilation, and they intend to use these in the third world war which they are preparing.

The bacteriological weapons include pathogenic agents or their toxins, to be deployed for annihilation of humans, animals, contamination of agricultural land, food, feed stores, etc., during a future war [13].

There are hundreds of pathogenic agents suitable for bacteriological warfare. Theodor Rosebury, an American scientist, lists the pathogens of 33 infective diseases for possible use as biological weapons; among them are plague, anthrax, tularemia, brucellosis, yellow fever, glanders and psittacosis. The agents of cholera, typhus abdominalis, smallpox and spotted fever have been excluded from this list, for according to some American authors [54] they fail to meet certain requirements for bacteriological weapons.

To be included among bacteriological weapons, bacteria, viruses, rickettsia and toxins must meet the following requirements: they must be suitable for cultivation in large quantities and resistant to external effects; the disease should appear rapidly, i.e., have a short incubation period; it should be highly contagious; protection by artificial immunization or the application of specific effective medication should be impossible.

In the imperialist camp, biologic weapons are believed to have certain "advantages" over other means of mass destruction. "...The introduction of total war has led to fundamental changes in many concepts. Thus killing the citizens of an enemy nation might be less effective for victory than causing their illness, for each patient ties up the working capacity of a well person... We would also add that annihilation by nuclear weapons is very expensive, and only large countries can af-

ford it. Also, such weapons cannot be produced in secret. Bacteriologic weapons however can easily be produced in secret and are cheap to produce, thus within reach of small nations" [9].

Difficulty of detection is a specific feature of bacteriologic weapons, since they are colorless and inodorous. Their incubation period may vary from a few hours to several days, and the diagnosis may require some time, occasionally a few days.

Bacteriological weapons are characterized not only by variety of species but also of applicability. Almost any kind of ammunition can be filled with pathogenic agents and sent off. Planes can drop variously sized containers with infected insects, rodents, objects for daily use or food. Another method of bacteriological warfare applied by the withdrawing enemy is the infection of water supply, stored materials, food and the soil in that area. Upon withdrawing, the enemy may also infect the civilian population, prisoners of war, the injured and sick and the domestic animals, in his attempt to contaminate the pursuing troops.

In a war conducted with bacteriological weapons, pathogenic agents which can be transmitted in aerosol form would naturally assume particular importance. Among these belong the infectious diseases listed by Rosebury. Among the toxins, that of C<sub>l</sub>. botulinum could be used; it is the most potent toxin known, may enter the organism by the digestive, the respiratory tract or the conjunctiva; the incubation period is short (2-48 hours), the lethal dose 0.01 mg, and mortality is high.

Application of bacteriological warfare will confront the Medical Service with unusual and complex tasks, particularly since defense against and liquidation of biological aggression are among its foremost duties. The massive use of highly virulent agents, the application of bacterial aerosols and a combination of bacteriological and other wea-

pons (particularly chemical) may greatly complicate, even alter the course of an epidemic. Some infectious diseases may be transmitted in unusual ways [18].

The extent of medical casualties from biological weapons might be subject to considerable variation. The better the intelligence on the enemy's store of biological weapons, the better vaccinal protection in its own army and preparation of the Medical Service for bacteriological defense, the lower the losses. Nor should the effect of meteorological conditions be underestimated.

We would assume that medical casualties caused by chemical and bacteriological weapons in a future war would occasionally equal those from nuclear weapons.

From these considerations on medical casualties an important conclusion should be drawn for the organization of medical care in a war:

In a nuclear war, the number of injured requiring the care of an internist may well be higher than in past wars. This would be caused not only by the harmful effects of weapons for mass destruction but also by the possibly altered defensive reactions of the organism which may provoke an increase in other somatic diseases. Surgeons and internists will have to work in close collaboration and, for the first time in history, field internists will be just as important as surgeons [58]. This assertion is based on the estimate that 30-35% of the casualties in a future nuclear war will require surgical, 35-40% the internist's help.

#### 4. FUNDAMENTALS OF THE ORGANIZATION OF MEDICAL TREATMENT AND MEDICAL TRANSFER IN THE FIELD

In connection with the listing of duties imposed on the army's Medical Service in war (2.3.), we referred to the primary importance of therapeutic activities related to moving the injured.

The conditions of modern combat, its fast and highly mobile character and the expected massive influx of injured makes combination of first aid and transfer a necessity. It should be understood that this practice which differs fundamentally from that current in peacetime is no more than an unavoidable emergency solution; some adverse effect on the healing process is bound to appear for any, even the most comfortable kind of transportation, puts additional stress on the injured or sick individual, likely to disturb the healing process. Another disadvantage is seen in the lack of continuity in treatment, since the injured must pass through many hands at the various dressing stations and field hospitals and be treated by many physicians and nurses.

##### 4.1. REQUIREMENTS FOR MEDICAL AID

Considering all factors which affect organization of the Medical Service (1.3.) the following requirements are at present valid for medical aid and treatment:

1. First aid for casualties in the field must be applied early so as to obtain an optimal number of survivors and prevent dangerous complications during the healing process.
2. The injured must be transferred as soon as possible to the specific medical installations for treatment until recovery.

3. Continuity of treatment should be achieved by proper distribution of therapeutic measures between the various stations of the medical transfer (dressing stations, field hospitals).

We shall now show how these requirements are to be met.

#### 4.1.1. Early Medical Aid

The timing of medical first aid will usually be decisive for the further fate of the injured. We do not exaggerate if we say that this fate - recovery, invalidism or death - is decided on the battle field.

This assertion is confirmed by experience gained in past wars. If first aid is not applied on time the number of complications will increase by leaps and bounds. An interesting observation based on the 2nd World War was published in the SSSR [25]; if first aid in the field was delayed by more than 3 hours counted from the time of injury, the number of complications increased by close to 75%. During the Great Fatherland War, first aid in the field was applied in

5.9% by the injured himself,

32.3% by mutual help,

53.0% by medical orderlies or non-commissioned officers,

8.8% by feldshers or physicians.

About 66% of the injured received first aid in the first 30 minutes after injury; in 34% first aid arrived after one half hour. These data show the low number of injured who were able to help themselves and the relatively low percentage of injured directly helped by their comrade-in-arms (mutual help).

Under the conditions of a war conducted with means of mass annihilation and the anticipated consistent discrepancy between the number of medical casualties and medical forces, means and resources of the Medical Service, self-applied or mutually applied first aid will have

to be practiced on a considerably larger scale [16]. We would want to stress this point now and to stress the importance of instructing in peacetime all members of the armed forces on how to apply first aid to oneself and to others.

Early first aid is thus contingent on the following factors:

- a) the ability of the injured to apply optimal first aid to himself or his comrades (Figs. 1-5);
- b) correct distribution of the Medical Service's forces and means throughout the units and troop parts; proper organization of first aid;
- c) optimally rapid removal of the injured and transport to the next medical transfer station;
- d) maximally close location of first aid station and field hospitals to the troop's field of operations or the active focus caused by the enemy's means of mass annihilation.

#### 4.1.2. Rapid Directed Transfer

The requirement that the injured be transferred as soon as possible to that medical installation where he can be treated until recovery is based on medical reasoning. The sooner he is brought under the care of a specialist at the special department provided with the diagnostic and therapeutic facilities appropriate to his injury, the more favorable the effect on the healing process. This directed medical transfer is achieved as follows:

- a) by careful medical "classification" of the injured at each transfer station (see 4.4.);
- b) by using a sufficient number of fast ambulance vehicles (overland ambulance vehicles, helicopters, transport planes, boats, etc.),
- c) deployment of mobile field hospitals close to the front lines.



Figs. 1 and 2. Self-help.

#### 4.1.3. Continuity of Treatment

Continuity in the systematic treatment of the injured, an essential medical requirement, is achieved by:

- a) identical opinions on the pathogenesis,
- b) identical opinions on therapeutic methods. Analogous concepts on the appearance and course of pathologic processes as well as uniform

guidelines for therapy valid for all military physicians are the basis for the successful medical treatment of wartime injuries and diseases. Different opinions on pathology and therapy which are permissible, even desirable in peacetime, the existence of various currents and "schools" of scientific thought, these are forbidden at the level of the field Medical Service, i.e., the regiment and division dressing stations. Rather than impose restrictions on the field physician's handling of the case, this requirement will assure continuity of treatment. Only if all field physicians and their helpers adhere closely to the respective instructions and guidelines developed by the specialists can a first, second, or third change of treatment at the regiment's, the division's dressing stations and the field hospital be avoided;



Fig. 3. Self-help.

c) thorough medical documentation

This includes the file card of the injured (see page 139) and the case history to be continued by the clinical departments of the field hospitals. There is no need further to explain the importance of reporting and follow-up by means of these two documents. To determine

which treatment is indicated at the specific station each physician in charge must know the diagnosis established at the previous station, prior therapeutic measures and their timing. It is of course understood that these documents (injury file card and case history) will accompany the injured until he reaches that medical installation where final treatment until recovery is applied.



Fig. 4. Injection ampule from the Medical Protective Package



Fig. 5. Self-injection of an antidote.

#### 4.2. FORMS OF MEDICAL FIRST AID

The following forms of medical aid are usually distinguished in military medicine:

##### 4.2.1. First Aid

The soldiers apply first aid to themselves if they can or they receive first aid from their comrades-in-arms. To this effect every member of the armed forces carries an Individual First Aid Kit (Fig. 6) and a Medical Protective Package (Fig. 7). Frequently this first aid is applied directly in the field by the medical orderly or non-commissioned officer.

Application of first aid should permit the injured to get to the regiment's first aid station either under his own power or by some means of transportation.

This involves the following measures:

- a) extinguish flames if clothing is on fire (Fig. 8),
- b) keep the injured dry and warm,
- c) offer hot beverages (tea) except in neck or abdominal injuries,
- d) give antidotes in poisoning by chemical weapons,
- e) apply the first sterile dressing,

(The first dressing should reliably protect the wound from secondary infection and adhere sufficiently tight to preliminarily stop the bleeding. It must be simple and easy to apply).

- f) apply preliminary splints for broken limbs (Fig. 9),
- g) if necessary put gasmask on the injured (Fig. 10),
- h) partial sanitary treatment, i.e., mechanical removal of radioactive deposit from unprotected parts of body and from clothing,
- i) in respiratory disturbances, oxygen treatment by mouth-to-mouth breathing or a small respiratory apparatus,
- j) pain sedation with 100 mg intramuscular Dolcontrol,

- k) application of an airtight dressing in open pneumothorax,
- l) organization of the serial medical transfer.

The earlier used method of subdividing into "first aid" and "pre-medical aid" all measures taken prior to handing the injured over to the first physician at the independent battalion or to the physicians at the regiment's station is now outdated; considering present fighting conditions and the massive influx of injured to be expected, self-help, mutual help and that rendered by members of the ambulance corps, their non-commissioned officers and feldshers will at best achieve what we listed above. The feldshers' main, for high casualties their only duty will consist in organizing the optimally rapid transfer of the injured to the regiment's dressing station (see 9.2.).



Fig. 6. Individual first aid kit.

All first aid measures on the battlefield should serve the following two ends: reduce loss of blood and prevent shock. Medical transfer from the battlefield to the regiment's dressing station or the first physician includes collecting the injured in so-called casualty centers, systematic "combing" of the battlefield and removing the injured to these centers (by members of the regiment's ambulance corps),



Fig. 7. Protective medical package.

transfer by stretcher or motorized cart to the transport station (stops of ambulance vehicles closest to the front lines).

#### 4.2.2. First Medical Help

This first aid by a physician should be applied within 4 hours after the injury. It may consist in the following measures:

- a) all first aid measures not yet done or requiring repetition,
- b) intravenous infusion of 250-500 ml Infukoll (dextran) to keep the circulatory vessels filled [55],
- c) immobilization of the tongue in the unconscious,
- d) tracheotomy in asphyxia,
- e) blocking of the vagosympathicus in thoracic injuries with open pneumothorax,
- f) catheterization or puncturing of the urinary bladder in urinary retention,
- g) injection of antibiotics, sera, etc.,
- h) grading of the injured, i.e., decision on the order of further transfer, the means of transportation (ambulance, truck, helicopter,

etc.) and the position to be assumed during medical transfer (lying down, sitting up).

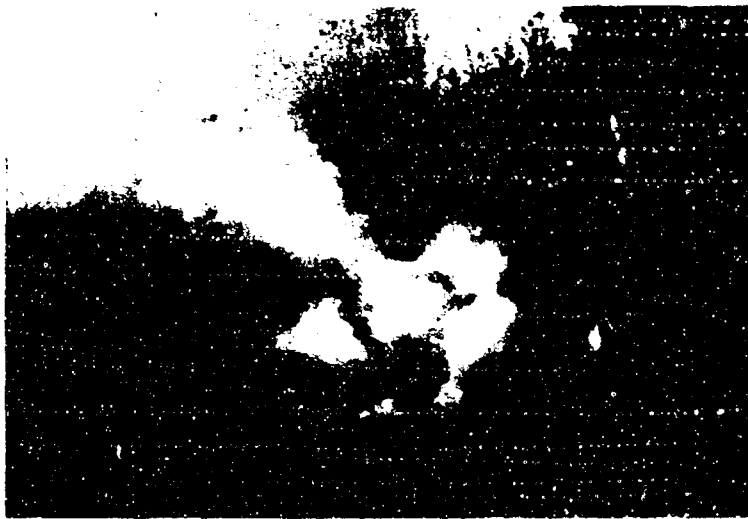


Fig. 8. Extinguishing burning clothing.

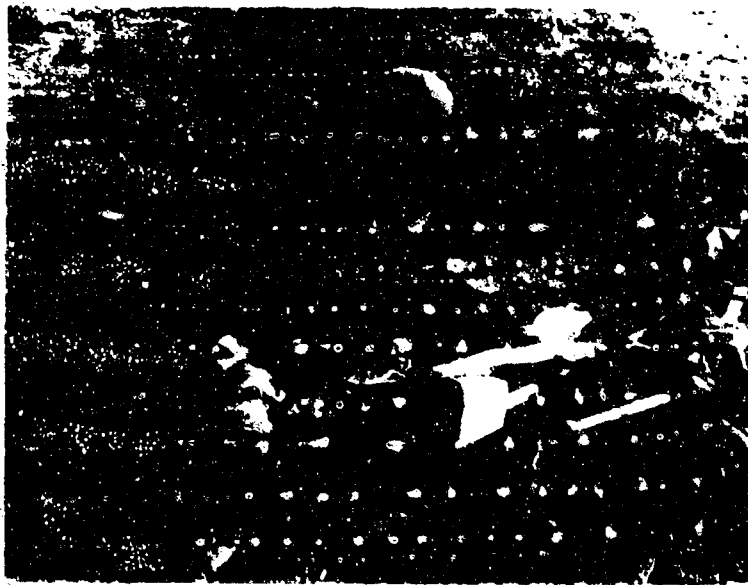


Fig. 9. Application of a temporary splint.

First aid in the field and by the physician are essentially directed at keeping the injured alive, combating present and averting possible dangerous future complications; maximally rapid and medically safe transportation should be provided to the medical installation where he can be treated by a specialist or cared for until recovery.

In general, the injured will have received first aid and first by a physician before he reaches the specialist.



Fig. 10. Putting gasmask on the injured.

#### 4.2.3. Care by the Specialist

Special medical care, i.e., by a specialized surgeon or internist should be started 12-18 hours after injury. The following measures are part of special medical care:

a) plasma replacement (with a suspension of dry plasma) and application of a lytic cocktail (50 mg Propaphenin plus 50 mg Prothazin

plus 100 mg Dolcontral) [2, 63],

b) final arrest of blood loss (suture if large vessels are injured),

c) artificial respiration until spontaneous and sufficient respiratory activity has been established,

d) performance of all immediately lifesaving surgical interventions (tracheotomy, thoracotomy with manual cardiac massage, emergency laparotomy with transdiaphragmal cardiac massage, sectio venae, exarticulation or amputation, etc.),

e) grading of the injured into those requiring immediate lifesaving care, those that cannot be transported, those who can be transported because postponing medical care will not harm them, those with minor injuries and the sick,

f) within the first 2 days after injury: blood chemistry (at least leucocyte count) in all cases of radiation injury to distinguish between severe, moderate and mild cases and determine the urgency for further treatment and order of transfer; diagnosis of acute radiation sickness can only be established at the regiment or division dressing stations on the basis of anamnestic data (presence in the contaminated area), the dosimetric data and findings from mainly external examination,

g) temporary hospitalization of the injured.

#### 4.2.4. Specialized Medical Care

Specialized medical care includes all measures directed at curative therapy by specialists in the respective branches of medicine and in the appropriate clinical departments. The art of organizing the medical support of field operations consists in providing specialized medical care for the injured with maximal speed and move him as fast as possible to a place where special treatment is available [50]. This can

be achieved by early deployment of mobile medical facilities (field hospitals) where specialized medical aid is available right behind the fighting forces or close to an active focus and by a rapid and careful medical transfer - skipping stations if necessary - to the field or base hospital.

The classification of all therapeutic measures into first aid, medical first aid, special medical aid, and specialized medical aid is of great practical importance, for it permits the orderly distribution of therapeutic measures over the various stations of the transfer route and the specific determination of the scope of medical care to be rendered at the stations and field hospitals.

#### 4.3. MEDICAL TRANSFER

The following means are deployed for moving the injured:

a) stretchers, emergency stretchers (Figs. 11,12),

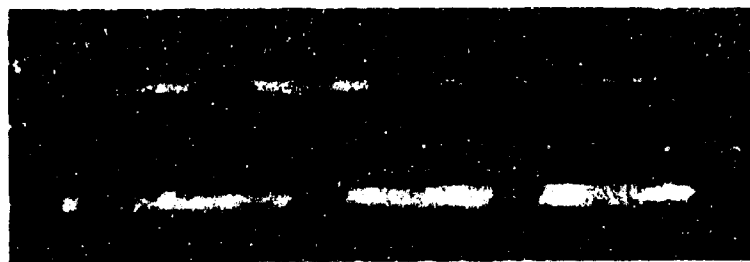


Fig. 11. Emergency stretcher consisting of two poles and a strap.

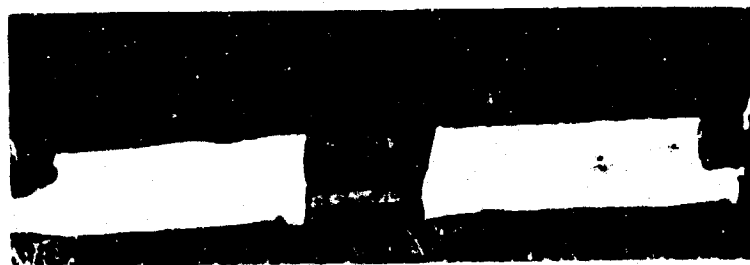


Fig. 12. Emergency stretcher consisting of two poles and two bags.

b) variously constructed carts for moving (Fig. 13),



Fig. 13. One variant of a motorized cart for moving the injured.

- c) ambulances (Figs. 14, 15),
- d) military combat vehicles and trucks adapted for emergency transport of the injured,
- e) trucks (for medical transfer of men with minor injuries),
- f) airplanes and helicopters equipped for the transfer of the injured,
- g) emergency, auxiliary and regular hospital trains,
- h) freighters and passenger boats equipped for transportation of the injured.

Medical transfer is usually organized according to the "inward" principle, i.e., the particular chief physician uses his forces and means to organize the moving of injured from the station at the next lower echelon to the medical installation directly under his command; e.g., the division physician must use the ambulance vehicles at his disposal to organize the early, rapid and careful transfer of injured from the regiment's dressing stations to that of the division. He is responsible for the rapid emptying of the regiment's stations by moving the injured concentrated there to places providing special medical aid.

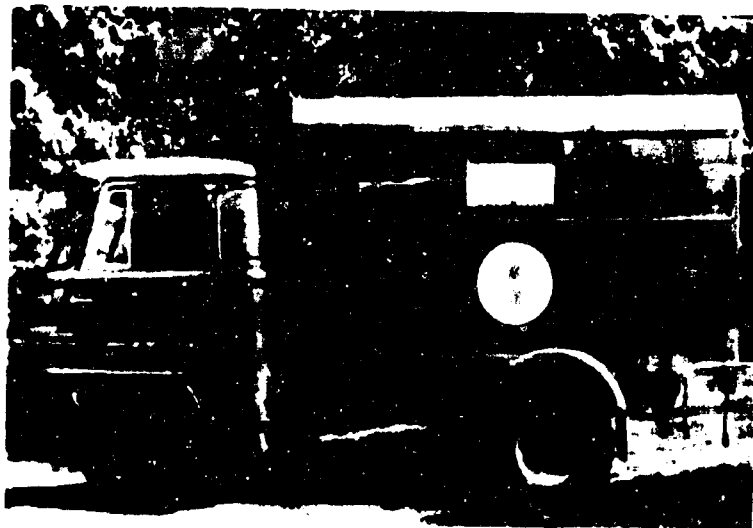


Fig. 14. Ambulance LO 1800 A for transporting 6 lying down and 7 sitting up, or 4 lying down and 11 sitting up (3 in the driver's cabin).

Similarly, the regiment physician's responsibility consists in moving the injured from the field of battle; he must apply the forces and means of the regiment's Medical Service to rescue and collect the injured and organize their transfer to the regiment's dressing station.

This form of organizing medical transfer does not exclude application of the principle of "outward" transfer under certain circumstances. In each case the higher medical instance must decide according to which principle medical transfer is to be organized.

In consideration of the above we would particularly mention that the injured need by no means pass through all the stations of the medical transfer system; on the contrary, if circumstances so permit, the transfer should be organized to omit some stations. Thus, e.g., physicians at the army, corps and division level will always have to attempt moving certain groups of injured from the regiment's dressing stations to the hospitals at the field hospital base without going through the division's station. It will occasionally be possible and useful to move injured men, priorly treated at division stations, by

air to auxiliary hospitals at home.



Fig. 15. Loading of a military ambulance.

Such organization of medical care and transfer of the injured conforms to the initially formulated requirements (4.1) for medical aid and care: accurate distribution of therapeutic measures among the various stations, careful transfer and deployment of medical installations close to the front will help reduce to a minimum the harmful effect of moving, and the principle of treatment on location, so desirable from the medical point of view (see 1.2.2.), will also be largely adhered to.

Medical transfer of the injured is, as mentioned earlier, an emergency measure, required only because it is impossible to institute special therapeutic measures during field operations at the place where the injury occurred.

#### 4.4. MEDICAL GRADING

Continuity of therapeutic measures and the dispatch of the injured to the medical installations where they are to receive final treatment until recovery can be accomplished only if they are accurately classified at each stage of the medical transfer.

Medical grading means grouping of the injured according to identically timed transfer.

Under conditions of a war conducted with means of mass annihilation, medical grading assumes primary importance for the fate of the injured. Considering the high number of casualties to be expected, early and optimal care will be assured only by medical grading based on diagnosis and prognosis.

Medical grading of the injured at the various stations is properly made according to the following points of reference:

1. On the battlefield, initial grouping is done by the orderly, non-commissioned officer or feldsher after applying first aid. He must decide on

a) the order in which the wounded are to be transferred (see 4.2.1.) and

b) isolate the injured who might present a danger for their environment (contamination, poisoning, infection) from the rest of the wounded, injured or sick (separate means of transportation!).

This initial grouping requires some basic diagnostic knowledge and ability from lower and middle-rank medical personnel, for the order of transfer determines the time at which the injured will reach the phy-

sician and receive medical first aid.

2. Distributive stops, established in front of the regiment's or division's dressing stations are manned by a non-commissioned medical officer or feldsher who stands by the road leading to the dressing station and is charged with dividing the arriving injured into three "streams:"

a) injured in need of so-called "sanitary treatment" (if body surface or clothing are contaminated with radioactive matter or chemical poisons). This requires dosimetric control (Figs. 16, 17). For sanitary treatment, special places are set aside, or rooms adapted for this purpose located off the dressing stations;

b) injured who require isolation;

c) injured who require neither special sanitary treatment nor isolation, thus can be moved directly to grading and transfer departments (see 4.5).

The distributive stop's main task thus consists in isolating the injured who represent a danger of self-contamination. The distributor is not expected to find more than an insignificant percentage of infectious cases, particularly at a time when no bacteriological weapons are deployed by the enemy. Radiation injuries are a lesser problem since dosimetric monitoring permits reliable separation of those requiring sanitary treatment. We may thus conclude by saying that the search of infectious cases must continue at the admitting and transfer departments from where the so found cases are then moved to the isolation department and prepared for immediate transfer to the field hospital for infective diseases.

3. In the grading and transfer departments of the stations where medical first aid or special medical aid is provided, the wounded, injured, poisoned or sick men should be grouped as follows:

- a) those requiring immediate help at this station such as
- surgery in the dressing or surgical department (see 13.3.2.),
  - shock prevention at the shock department,
  - other lifesaving measures,



Figs. 16 and 17. Dosimetric monitoring at the distributive stop.

- b) those that cannot be transported; this can occur only at a division station (all injured must be moved from the regiment dressing

station!);

c) those who will tolerate transportation, i.e., whose further treatment can be postponed. This group should be subdivided according to the following points of reference:

- destination of the next medical transfer (division dressing station, field, special or reserve military hospital),
- the means of transportation (ambulance, truck, bus, railroad, airplane, helicopter, boat, etc.),
- their posture during transportation (sitting up or lying down);
- according to the serial order of transfer (transfer of first order, second order),

d) men with minor injuries and the sick. In principle, separation of these cases from the others is always indicated, for it will facilitate control at the dressing stations and contribute towards more efficient organization of aid for the severely injured [48].

Minor injuries are hardly classifiable according to the care they require (surgeon, internist). These are wounded, injured or sick expected to recuperate within 5-10 days either on location or at a field hospital for mild cases.

4. In contrast to earlier wars "grading at the station" will assume greater importance in a nuclear war, particularly at medical installations for specialized medical aid, in the field hospitals of the hospital base and auxiliary hospitals. The main reason is to be sought in the specific course of acute radiation sickness, the occasionally unexpected transition from one stage to the other and its effect on the healing process of other injuries. Constant clinical and hematological examinations are required for a study of the development of radiation sickness and determination of its severity to permit a decision on whether surgical or systemic treatment should be accorded priority;

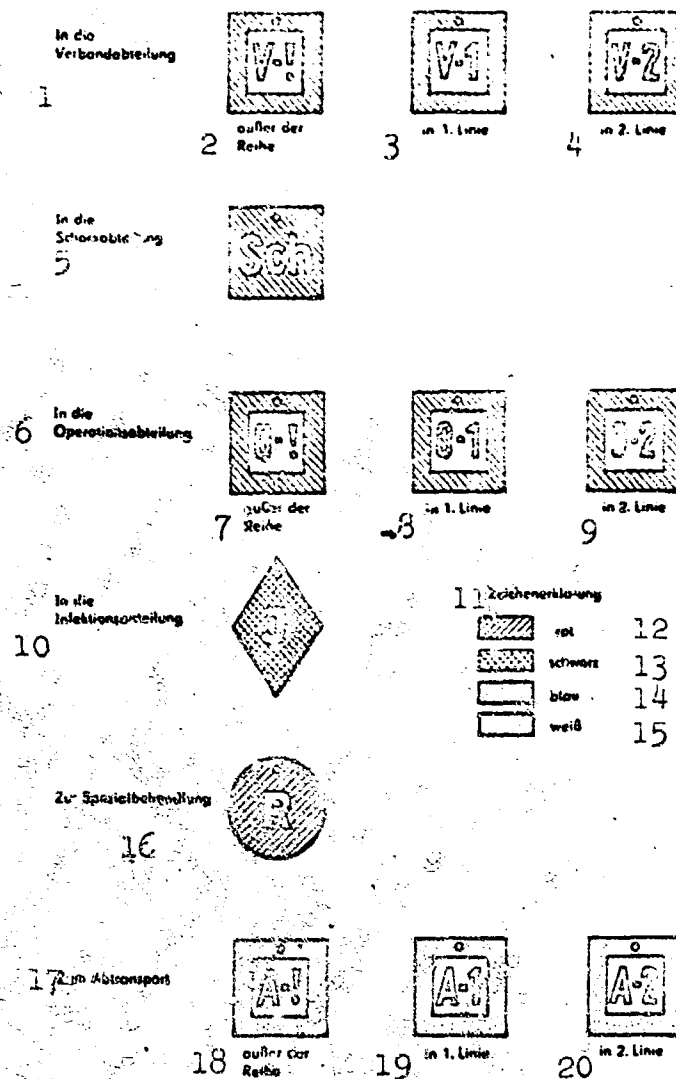


Fig. 18. Grading buttons. 1) To the dressing department; 2) at once; 3) in first line; 4) in second line; 5) to the shock department; 6) to the surgical department; 7) at once; 8) in first line; 9) in second line; 10) to the department for infectious diseases; 11) explanation of shading; 12) red; 13) black; 14) blue; 15) white; 16) for special treatment; 17) for transfer; 18) at once; 19) in first line; 20) in second line.

this decision is the equivalent of grading.

Correct classification of the injured at each medical transfer station is so difficult and so important for the patient's fate as to require highly experienced physicians. The difficulties are obvious if we imagine that the physician who grades the injured at the regiment or division dressing stations must establish the diagnosis and take a decision on what to do with the patient without the possibility of re-

moving the dressing or obtaining a detailed case history. In the majority of cases physicians will have nothing more to go by than a superficial examination and the data marked on the file card [6].

At the regiment's dressing station the chief will properly take it upon himself to classify the incoming injured; at the division's grading and transfer departments, an experienced surgeon and if necessary an internist might be charged with the grading.

Sorting the influx of massive casualties necessarily requires certain adjuncts such as

- a) grading signs (for classification within the station),
- b) the injury card.

The results of medical classification are shown by buttons (Fig. 18) attached to the patient's clothes. Such markings permit the medical orderlies to move the injured at once and without additional medical instructions to their destination within the dressing compound or hospital.

The injury card (see pages 135 and 139) is one of the most important documents in military medicine; it is also used for marking the mode of further medical transfer.

#### 4.5. STATIONS OF MEDICAL TRANSFER

The expression "stations of medical transfer" means the deployment of forces and means of the Medical Service (dressing stations, hospitals) along the roads leading behind the lines and to the hinterland; the stations are used for the medical care of the injured (Fig. 19).

While internal structure and setup of such station, dressing station or hospital are always determined by the specific conditions of field operations, their functional structure will essentially be the same on each level.

A medical transfer station will always dispose of

1. a distributive stop (see 4.4.),
2. a locality or department for special treatment, i.e., for partial or complete sanitary treatment of individuals exposed to radioactive fallout or substances from radioactive weapons.
3. classification and transfer departments; these will require most of the available space; there the incoming injured are admitted, registered, grouped and if necessary treated (e.g., checking, improving or changing of dressings or splints, injection of antibiotics, sera, etc.) and prepared for further transfer.

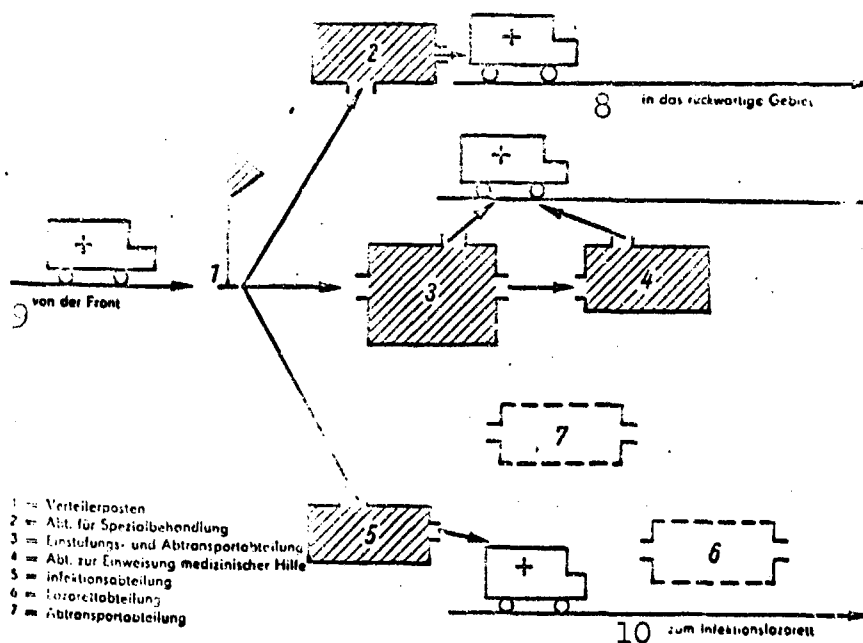


Fig. 19. Schematic representation of a medical transfer station. 1) Distributive stop; 2) department for special treatment; 3) grading and transfer department; 4) department for medical aid referral; 5) department for infections; 6) hospital department; 7) transfer department; 8) direction to behind the lines; 9) from the front; 10) to hospital for infectious diseases.

4. the dressing, surgical and shock department.

5. the department for infectious disease.

According to specific conditions there may be additional departments such as

6. the hospital department; this is set up within the framework of

the division's dressing station if non-transportable patients must be temporarily hospitalized or those with minor injuries requiring 5-10 days hospitalization can be accommodated;

7. The transfer department; since almost all medical transfer stations serve only as interim stops for the injured (except for the hospitals for infectious cases; these cases are retained until recovery!), a massive influx of injured will frequently require the setting up of a separate transfer department so as to facilitate the work of the grading department. This transfer department is properly set up close to the grading.

According to need and opportunities, departments may be subdivided; thus the grading and transfer department of the division's dressing station might consist of 2-3 subdivisions: a grading and transfer division for major surgical, one for minor surgical cases and a third one for diseases. Such structuring will certainly speed up the processing of the injured.

#### 4.p.1. Choice of Location

Choice of a location is important for the deployment of a medical station. The regiment or division physician will try to adapt buildings at the outskirts of settlements, ruins, basements or underground structures vacated by the fighting forces for installing the departments of the dressing station. Deployments in ruins and basements will be the rule, for rarely are time, forces and means available for a fully engineered construction of the dressing station. Choice of location will obviously depend on the fighting situation, the relief of the countryside and the given opportunities and should meet the following basic requirements:

a) Distance from the fighting forces should be selected so that no more than 4 or 12 hours respectively are required for transfer to the

regiment or division dressing station. Thus the presence of obstacles like water courses or poor roads would call for a much shorter distance from the fighting forces to assure early medical first aid.

b) The medical installations should be located close to the roads leading to and from the front; they should dispose of sufficient parking space and good connecting roads between the various departments of the dressing station.

c) The deployment site should be sufficiently removed from objects which might draw enemy fire (mortar emplacements, observation posts, traffic centers, objects of military importance, etc.).

d) A source of water should be close by (wells, springs, brooks, a river, pond or lake).

e) The deployed medical installation should be masked against airplane reconnaissance or should be easy to mask.

f) Another consideration in the selection of the site is natural cover which affords protection against the harmful effect of a nuclear detonation; such cover may be represented by ravines, small valleys, secondary inclines, the border of young leaf-tree or high pine forests and dense shrub.

If these requirements are to be largely met, careful medical reconnaissance must precede the installation of a medical transfer station, i.e., deployment of a dressing station or group of field hospitals; details of the anticipated deployment should be based on the results of such reconnaissance.

#### 4.5.2. Moving

The mobile character of hostilities in modern war, frequent maneuvering during fighting require frequent displacement of medical units and troop parts; dressing stations deployed by the medical units and troop parts of regiment or division form an integral part of these mil-

itary units and must follow the fighting forces to carry out their tasks. The site of the installations, organization of work and the attainable scope of the aid given depend mainly on the fighting assignment of the troop part or unit to which they belong.

The constantly changing combat situation, rapidly changing fighting assignments in a battle characterized by frequent maneuvering, the sudden appearance of active foci after nuclear enemy attacks with their massive medical casualties will force the chief regiment-, division, corps or army physician into frequent maneuvers with forces and means of the Medical Service. By this we mean their temporary concentration for optimal utilization at a certain location. Refusal to keep to prescribed organizational forms which may restrict maneuverability and the proper maneuvering of the Medical Service's forces and means are characteristic for the qualified, responsible and experienced military-medical commander and chief. The following modes of maneuvering may be applied:

1. The earlier mentioned moving of dressing stations and hospitals. The physician in command will try to move the whole station; leaving behind part of the forces and means to care for still remaining patients should be considered the exception rather than the rule, for this would diminish the station's readiness for coping with its work. Upon setting up the installation at the new site, it is advisable to start with the admission, classification and medical aid departments; the other departments, such as hospital, transfer and the quarters for the medical personnel may be installed later according to need and available time.

While frequent moving, particularly of regiment dressing stations, cannot be avoided under present fighting conditions, we should consider that disassembling, moving and reassembling at a new site takes long

precious hours which could be devoted to the care of the injured. An attempt should thus be made at moving medical transfer stations as little as possible without jeopardy to early aid to the injured or uneven distribution of the Medical Service's resources, overburdening one part of its forces and means while leaving the other partially idle.

2. Reinforcement of medical transfer stations by adding new forces and means (physicians, physicians' teams, ambulance personnel, stretchers, beds, etc.).

3. Increase or decrease of the amount of medical aid to be rendered (see 4.6).

4. Regrouping of ambulance vehicles so as to direct the stream of injured to another medical transfer station.

Only well considered execution of the specifically required and feasible maneuver with Medical Service forces and means will assure uninterrupted medical support of the battling troop.

#### 4.6. THE SCOPE OF MEDICAL AID

The scope of medical aid to be rendered at a specific medical transfer station will be determined prior to and during fighting by the physician at the next higher echelon. The right decision will depend on careful consideration of all factors affecting the maneuver. According to the situation, the commanding division, corps or army physician will have to judge which therapeutic or surgical measures can be performed at which station without endangering transfer of the injured. A decision on the scope of aid to be made available is required for two purposes:

a) the injured require early transfer to an installation where special care until recovery is available.

b) the medical transfer stations must retain their maneuverability, i.e., be emptied of their injured with optimal speed.

The scope of aid available at a station will depend on the following factors:

1. the fighting situation; in rapidly advancing attacks which cover 80, 100 or more km daily, the frontal stations of the medical transfer service will have to be moved frequently which will considerably reduce the aid available there. This may require a ruling according to which only the critically injured are to receive special medical aid at the division's dressing station while treatment of the others would be postponed until they arrive at the next station (hospital of the field hospital base);

2. the number and nature of medical casualties; an estimate based on experience on the casualties to be expected in the anticipated battle will importantly affect the medical commander's decision as to the scope of medical aid to be made available. A discrepancy between the number of casualties expected and the medical resources on hand will induce him to restrict the scope of medical aid at the dressing stations;

3. the forces and means of the Medical Service. The scope of special medical aid at the division station can evidently be enlarged if additional physicians' teams can be accommodated there, and some surgical teams can temporarily be assigned to this dressing station;

4. the state of the dressing station, its structures, the season and weather;

5. the transportation available;

6. the distance to the next medical transfer station.

In summary we would assert: the use of antibiotics, new means of preventive immunization, poison antidotes, modern equipment of Medical Service units, troop parts and installations, the application of new methods of shock prevention and pain sedation, modern ambulance trans-

portation particularly helicopters, permit reduction of the medical aid available at certain medical transfer stations, if so required, with concomitant broadening at others; hence indication for hospitalization may be considerably narrowed to exclude certain groups of otherwise nontransportable patients, and these may be transferred [19, 23, 35].

The medical commander who considers the above factors when determining the scope of medical aid to be rendered at the serial stations in each fighting sector will arrive at a fundamentally correct decision. He should preferably start with a minimum of therapeutic measures which may be extended under favorable conditions [66].

#### 4.7. CONCLUSIONS FOR ORGANIZATIONAL MEASURES

In consideration of the above guidelines on the organization of medical care and transfer in battle, we would conclude by stressing the following principles which should guide the medical commander's actions in organizing health protection of the army at war:

1. The foremost principle should be treatment on location wherever possible; special and specialized medical installations should preferably go to meet the injured, and treatment should be applied close to the place where the injury was received rather than at a place so far as to require long transportation to the dressing stations or hospitals possibly involving repeated change of vehicles.

2. Every attempt should be made to avoid changing the locations of dressing stations and hospitals, for only if these remain at the same location over long periods of time can physicians and their aides perform their work without being rushed, to the benefit of the patients. This important principle will be realized if the medical commanders dispose of sufficient reserve installations and know how to properly deploy and use them (see 13.4).

## 5. PRINCIPLES OF SANITARY, HYGIENIC AND ANTIEPIDEMIC SAFEGUARDS DURING FIGHTING

Sanitary, hygienic and antiepidemic measures belong among the essential duties of the Army Medical Service. These measures must be taken continuously under any conditions with the full participation of all members of this service.

They consist of a set of procedures aimed at

- a) improving the health of members of the armed forces,
- b) prevent the development and spread of disease, particularly infectious disease (see 2.3)

For their success, multiple preventive measures must constantly be planned, ordered, accepted, complied with and monitored. In the absence of such measures, epidemics cannot be avoided, for conditions for their development and spread are much more favorable in war than in peacetime.

Physical and mental stress and less favorable living conditions have an adverse effect on the state of health and resistance to infection; large-scale destruction has a negative effect on sanitary and hygienic conditions, and the use of bacteriological weapons by the enemy will increase the danger of epidemics.

Any endemic or epidemic disease represents a break in the front to be erected by prevention, a failure in the fight against appearance and spread of diseases. Prevention - including the important sector represented by sanitary, hygienic and antiepidemic steps - is by no means the sole duty of troop physicians and their aides; in fact, their work is doomed to failure unless all members of the armed forces, particu-

larly commanders, are made to participate.

#### 5.1. SANITARY AND HYGIENIC MEASURES

The sanitary and hygienic measures, rules, regulations, instructions and orders aim at maintaining and improving the army's state of health, further the soldiers' physical development and reduce morbidity in the troop.

The members of the troop's Medical Service are charged with executing or monitoring execution of the following assignments:

1. Constant surveillance of state of health and physical development in the armed forces. This may be accomplished through daily contact between medical personnel and the soldiers, during health inspection and serial examinations.

2. The members of the armed forces should be taught to follow the rules of personal hygiene, and this should be supervised. Sanitary-cultural education, instruction and talks on individual health protection, important for disease prevention in peacetime, acquire much more importance in a war conducted with the means of mass annihilation; in such a case, hygienically correct behavior may protect the individual confronted with the dangers of incorporation of radioactive substances, poisoning by chemical weapons or infection with pathogenic agents.

3. Hygienic standards with respect to the quarters of combatants will have to be reduced to a minimum under field conditions, but this minimum should be adhered to and monitored, i.e., ventilation of underground shelters, heating, lighting, garbage removal, etc.

4. Hygienically safe storing and delivery of food, the preparation of meals and their issue require constant surveillance. Under primitive field conditions, food hygiene is an important means for averting food poisoning. Attention should also be given to the dietary value of the meals to assure adequate nourishment for the fighting men.

5. Supervision of the hygiene of water supply (springs, wells, piping system) are part of the Medical Service duties, as is the decision on its suitability for specific uses (water obtention belongs among the duties of the engineer corps, water supply among that of the food service). In a modern war, the possible contamination of sources or installations for water supply by material from radioactive, chemical or bacteriological devices makes the question of water supply for the army a central problem.

## 5.2. ANTIEPIDEMIC MEASURES

Antiepidemic measures aim at

- a) preventing infectious diseases in the troop.
- b) wiping out foci of infection.

### 5.2.1. Preventive Measures

The following set of measures is indicated for preventing the focal appearance of infectious disease in the army:

1. The above sanitary and hygienic measures are primarily intended to prevent the appearance of infectious diseases in the troop.

2. Epidemiologic information on the troop's state of health and its quarters belongs among the duties of all the members of the Medical Service. Investigation to this effect is directed at all levels by the chiefs of the Medical Service according to a preconceived plan (see 6.2).

3. Potential carriers of pathogens (insects, mites, ticks, rodents) should be controlled everywhere and at all times.

4. Vaccination is very important; creating effective long-lasting vaccinal protection in peacetime is a requirement to be met for the armed forces and, as far as economically feasible, also for parts of the population. This obviously depends on the available vaccines and their efficiency. At the outbreak of a war, a basic immunity should

have been established in all members of the armed forces against the following minimal number of diseases: smallpox, typhoid fever, paratyphoid A and B, dysentery and tetanus. According to need, vaccination against other diseases should be considered, among these also against plague, due to possible bacteriologic aggression. Here again, we should remember that no great changes in the state of the army's immunity are likely to be accomplished during a relatively short-lasting nuclear war; thus preparations have to be made in peacetime to prevent the appearance of dangerous infective diseases in wartime.

5. The detection and destruction of possible sources of infection, the constant search for and treatment of individuals who carry and constantly eliminate pathogenic agents are important antiepidemic measures; periodical clinical and bacteriological testing of feces from the food service personnel cannot be dispensed with during field operations.

6. In wartime, the numerous troop movements and migrations of parts of the population favor the spread of epidemics. For their prevention, barriers have to be erected between the frontlines and the hinterland. Sanitation control points must be created at certain intervals along the main routes of transportation. The trained medical personnel at these checkpoints is charged with searching the military transports to and from the front for individuals with open or suspected infections; these are then isolated and transferred for treatment. Facilities for sanitary treatment, disinfection and specific prophylactic treatment should also be available. The vigilant troop physician will not fail to check on the state of health of new arrivals transferred to his troop from other units and troop parts to avoid the introduction of infective diseases into his own troop. After sanitary treatment, he will try to obtain temporary separate quarters or group

the new arrivals in separate units (incubation period!).

7. Rapid liquidation of an epidemic among the population is an important measure for preventing the appearance of infectious diseases in the troop. Hence, the chiefs of Medical Service at all levels should lend their support to the organs of the civilian Health Service for carrying out this task.

#### 5.2.2. Liquidation of Infective Foci

Somewhat different antiepidemic measures are required if an epidemic outbreak occurs in the army despite all prophylactic measures. Then the organs of the Medical Service must proceed as follows:

1. Report this fact at once to the commander and the competent superior; suggest measures within their competence. If necessary explain why additional help and support is needed to liquidate the epidemic.

2. Careful search for cases of infection should be instituted (early diagnosis!). These should be isolated, like the suspect cases, preferably in separate quarters, and hospitalized. Final treatment is to be given at the destination, the hospital for infectious diseases, unless the area in which this hospital is located is threatened by the enemy and has to be evacuated.

3. Determining the infection focus, i.e., a search for the source of infection, requires particular attention.

4. The Medical Service chief must obtain accurate information on the epidemiological state of the troop and its quarters, for this will essentially determine the extent of control measures required. In evaluating the epidemiological condition, an identical terminology should be used to cover the same content, for this will facilitate both understanding and organization of required supporting measures that might have to be taken by the commanders and medical superiors. The epidemio-

logic state of the troop or its quarters should thus be evaluated as favorable, unstable, unfavorable or dangerous. "Favorable" means no cases of infection or few, unrelated cases, involving no danger of major spread throughout the troop. "Unstable" means poor sanitary and hygienic conditions in the lodgings and isolated cases of infection whose connection can be traced; clusters of infections with no tendency to spreading may still be considered "unstable." The same applies to cases of infection appearing in the population of the shelter accommodation and traceable to the same source or to such cases appearing in groups within a short period and representing a danger for the troop.

An "unfavorable" condition indicates the appearance of group infections in the troop with a tendency to spreading or a large number of cases of infection without precise diagnosis. A single case of a dangerous infective disease (plague, smallpox, cholera, etc.) may call for the evaluation "unfavorable."

"Extraordinary" in an epidemiological condition where the number of cases increases very rapidly within a short time, thus reducing considerably or to zero the troop's fitness for combat; the clustered appearance of cases with dangerous infections would also indicate an "extraordinary" state for the troop part. Quarantine will have to be imposed thus excluding the men from combat duty.

We would stress one important fact. The right to establish the epidemiological state of a troop part is reserved for the higher ranking commanders; their decision is based on the report received from a medical superior, i.e., the commanding corps or army physician.

5. All modes of disinfection, the application of insecticides and pesticides (rodent extermination) are also part of the procedures required for liquidating an epidemic focus.

6. The unaffected members of the troop part may have to undergo

specific prophylactic treatment, depending on the nature of the infection.

7. In the case of an unfavorable epidemiological state, the higher ranking commander may order epidemiological "observation" of the personnel (see 5.3.3). In an extraordinary situation quarantine may be imposed on the troop part.

### 5.3. MEASURES INDICATED FOR THE CASE OF BACTERIOLOGICAL AGGRESSION

Antiepidemic protection and its procedures would become much more complex in the case of bacteriological aggression by the enemy, for such attack has specific features which must be considered:

- a) In the majority of cases, the enemy's use of bacteriological weapons will be discovered by the Medical Service only after massive appearance of infectious diseases, for such substances are hard and slow to detect in the environment;
- b) the different bacteriological weapons can be applied by various methods;
- c) bacteriological, serological and virological diagnosis is complex;
- d) various pathogenic agents can be used simultaneously, and the infectious diseases can appear in conjunction with other injuries;
- e) extensive antiepidemic steps must be taken at the medical transfer stations, called the "antiepidemic regime" (see 5.3.3.).

Protection against the enemy's bacteriological weapons centers around three tasks:

Prevention of a surprise attack, reduction or inhibition of the bacteriological effect and rapid liquidation of the consequences of bacteriological aggression if the latter could not be averted.

#### 5.3.1. Prevention of a Surprise Attack

The troop leaders dispose of various means of intelligence for

learning which bacteriological weapons are available where on the enemy's side and for noticing other signs of an impending bacteriological attack. If, e.g., the enemy's soldiers are vaccinated against a disease which is rare or unknown as an epidemic in our latitudes, we may deduce that he intends to use this pathogenic agent as a weapon and is trying to prevent the spread of such artificially caused epidemic to his lines.

If it appears that the enemy might deploy bacteriological weapons in a certain sector, the following precautionary measures are indicated:

1. The gathering of epidemiological information must be stepped up. The organs of the Medical Service should be familiar with the prevalent endemic diseases and turn their attention particularly to those agents for which conditions in the fighting sector are favorable, thus rendering them dangerous.

2. The members of the armed forces are to receive once more instructions on how to behave in a hostile bacteriological attack and how to focus their attention and increase their acuity in this direction.

#### 5.3.2. Reduction of the Effect

If precautionary and preventive steps are taken on time, the effect of a bacteriological attack may be reduced or inhibited.

1. The epidemiological condition of the troop and its lodgings are important. Close adherence to antiepidemic and hygienic regulations should keep it at an optimally favorable level.

2. Ballistic or airborne enemy devices suspected of being contaminated with pathogens should be promptly destroyed.

3. The medical personnel should at once be prepared for work under conditions of bacteriological contamination (antiepidemic regime, see 5.3.3.).

4. Depending on the nature of the pathogen, specific preventive measures must be taken for the members of the armed forces.

5. Constant medical supervision of all the members of the troop part will permit isolation of those with fever and thus decrease the danger of a spread of the disease.

### 5.3.3. Removing the Consequences

If it was impossible to avert the surprise bacteriological attack, reduce or inhibit the effect of these enemy weapons, an epidemic focus - called a bacteriologically active focus - will have been created.

By "bacteriologically active focus" we denote a territory with its humans, animals, weapons, means of transportation and other objects which have been subjected to the effect of the bacteriological weapon and which may cause spread of infection among men or animals or damage to agricultural plants.

Liquidation of such an epidemic focus requires the following measures:

1. Specially trained forces of the Medical Service will take samples for laboratory tests to determine the nature of the pathogenic agent.

2. Special units will mark the boundaries of the contaminated sector, extending them by 1000-3000 m depending on meteorological conditions or by more if aerosols were used, into the uncontaminated terrain [29].

3. All individuals present in the stricken sector, i.e., the bacteriologically active focus, will be isolated on location until orders from the commanding physician have been received for their transfer to special medical installations (hospital for infective diseases).

4. Until notice to the contrary from the physician in charge, all members of the armed forces present in the bacteriologically active focus must continue to wear protective masks and clothing, i.e., behave exactly as if chemical or radioactive weapons had been deployed. The

protective mask excludes eating, drinking or smoking, which in any case is strictly prohibited within the active focus.

5. Special units of the Medical Service will at once start with preliminary disinfection and, if required, insect and rodent extermination.

6. Immediately after a verified enemy attack with bacteriological weapons medical "observation" is instituted. This consists in a systematic search for the source of infection and infected individuals and the execution of certain measures pertaining to prevention, therapy, isolation and delimitation of the focus [18]. The following individual steps are to be taken: the "antiepidemic regime" is instituted at the dressing stations, i.e., their various departments are divided so as to permit separate treatment and processing of the infected and suspect cases on one, and that of the rest of the injured on the other side.

Another essential step consists in the immediate interruption of further medical transfer of the injured present at the division's dressing station. This important and effective organizational measure is to serve two purposes: it contributes to delimiting the epidemic focus by preventing spread of the infection into installations at the rear and the hinterland, and this 2-3 day interval is also required for determining the composition of the bacteriological weapon applied by the enemy. This divisional dressing station must obviously be excluded from supporting the division's field operations; the commanding army physician will replace it with a similar installation, an Independent Medical Department. At the same time, reserve forces and means will necessarily have to be brought in to reinforce this divisional dressing station. Additional surgical teams and internists and the materials and supplies they use will be needed to render full special medical aid to all the injured until release for further transfer is obtained for the

station.

Only after the pathogenic agent has been identified will a decision be made on the fate of the injured and sick.

If the enemy applied the causative agent of a common infective disease (dysentery, infectious hepatitis, paratyphoid, etc.), the injured and sick will be moved from the divisional dressing stations where medical transfer had initially been stopped to a special group of field hospitals erected as close as possible to the bacteriological focus ("treatment on location!"). Here they will be treated - if the battle situation permits - by specialists of every kind until recovery.

Another procedure is indicated if the enemy's biological weapon is the causative agent of a dangerous disease. Then injured and sick must remain at the divisional dressing station. Strict quarantine measures must be instituted. In this case, the scope of medical aid to be rendered at the divisional station must be enlarged to comprise also specialized medical aid; this dressing station must be reinforced according to need with specialists and the respective instruments and equipment.

7. If agents of known dangerous infectious diseases are used by the enemy or if other, highly contagious but not dangerous diseases paralyze the troop's fighting force, this unit or troop part will be put under quarantine, which usually means removing the troop from combat. Quarantine consists of a set of antiepidemic measures directed towards strict isolation of the epidemic focus and liquidation of the epidemic. Quarantine is declared by the superior commander upon recommendation by the respective physician in charge; it is characterized by the following restrictions:

a) the boundaries of the epidemic focus are safeguarded by armed personnel.

b) Nobody may leave the epidemic focus, and entrance is permitted only in exceptional cases for medical reasons or those related to supply.

c) The quarantined men should be divided into small isolated groups; this will facilitate supervision and permit lifting of the quarantine for individual groups if no new cases appear after the incubation period.

d) Daily taking of temperature and medical examination serve to detect the sick and suspect cases.

e) Patients and suspect cases should be isolated in separate groups and hospitalized.

f) Complete sanitary treatment (see below), disinfection of weapons, equipment and the terrain are further important measures directed towards liquidating the effects of a bacteriological attack.

The duration of the observation period or quarantine depends on the nature of the causative agent. Quarantine is lifted by the chief commander only if the incubation period following the last case has passed without the appearance of new cases, following which the disinfection process has been repeated. The medical installations may return to normal operations only after the isolation of the last patient has been lifted.

8. According to the combat situation, so-called sanitary treatment will be applied partially or completely. The sanitary treatment of the injured serves two main purposes: the injured should be protected against the effect of the pathogenic agents (or radioactive or chemical substances) which cling to body, clothing or objects of daily use, and a spread of the pathogenic agent shall be averted.

Partial sanitary treatment should be done by the combatant himself in the field, whatever the conditions. It involves mechanical

cleaning of all parts of the uniform (wipe, do not shake!) and disinfection of exposed body parts. Partial sanitary treatment of the injured may also be done by the medical personnel of the regiment's dressing station in a room specifically reserved for this purpose (see 10.2.4.).

Complete sanitary treatment at specific locations installed by the Chemical Service or - for casualties - at the divisional dressing station or field hospital involves the following measures: the men take a shower or are washed thoroughly with warm water and soap, the dressings are renewed and all parts of the uniform are disinfected and renewed.

In summary we would say that rapid and skillful elimination of the effects of a bacteriological attack depends to a large degree on training and experience of the members of the Medical Service, its equipment, the state of medical knowledge in the fields of diagnosis and specific prevention of infectious diseases. Systematic instruction of the armed forces on the nature of bacteriological weapons and the principles of antiepidemic protection as well as a high sanitary and hygienic level in units and troop parts afford some guarantee that infectious diseases will play no important role and no epidemics will occur which might considerably lower the troop's fitness for battle.

## 6. FUNDAMENTALS OF THE ORGANIZATION OF MEDICAL RECONNAISSANCE

Early, reliable, active and persistent medical reconnaissance is one of the prerequisites for properly organizing the medical support of engagements. It is essential for solving the main tasks of the Medical Service, i.e., medical treatment of the injured and antiepidemic protection of the troop.

Medical reconnaissance means the early and constant search for factors which affect the organization of medical aid.

In this connection we would stress an important point. It is understood that every member of the Medical Service is at all times required to search for data obtainable on conditions which may affect the state of health of the armed forces, the epidemiologic state of the troop and its quarters, the organization of medical treatment and transfer of the injured. He should use the facts obtained as basis for his decisions and also report them to his superior.

The medical chief will independently organize medical reconnaissance using the forces and means at his disposal.

### 6.1 METHODS OF MEDICAL RECONNAISSANCE

1. The physicians who head the tactical and operative formations will try to obtain early important information (preferably before the start of operations!) by studying the military-geographical or military-medical-geographical descriptions of the field of operations. Data on climatic-geographical conditions, the road and traffic network, population movements, the organization of the civil public health service and the rate of disease in the population will affect decisions on the suitable organization of medical support.

2. The study of topographic maps will assume first place in any reconnaissance organized by the commanding regiment or divisional physician. It will provide important information on the nature of the terrain, the flora, water conditions and the street and road network.

3. The military-medical chief will frequently obtain reconnaissance data from his headquarters. These data, derived from general reconnaissance, may contain indications on an impending enemy attack with mass annihilation devices, on the epidemiologic state of the enemy troops and their billets, on existing medical installations in the enemy's territory, or similar information.

4. The most reliable data in the territory occupied by our own troops will be obtained by our own investigations and by employing special reconnaissance units. According to the purpose of such reconnaissance and the specific situation, the composition of such reconnaissance units may vary; within their framework, medical non-commissioned officers (N. C.O.), felushers and specialists in various medical fields may be charged with specific duties.

The employment of such a reconnaissance unit must obviously be carefully planned according to the "Plan of Medical Reconnaissance".

This plan must contain the following data: the composition of the reconnaissance unit and the means at its disposal, the aims of the reconnaissance, route, assignment and the time available until the results of the reconnaissance must be reported [57].

## 6.2 MODES OF MEDICAL RECONNAISSANCE

According to assignments several kinds of medical reconnaissance may be distinguished. This differentiation is purely theoretical and has no effect on organization of the reconnaissance.

1. Medical-tactical reconnaissance means the gathering of data which may be important for maneuvering the forces and means of the Medical

Service and which affect organization of medical treatment and evacuation of the injured. Thus, e.g. within the competence of company and bataillon, the medical N.C.O. and the chief feldsher will determine the sites for setting up collection centers of the injured, the routes to be used for rescue of the injured, and they will reconnoiter conditions for moving the ambulance post forward. The regiment physician will personally determine the most favorable routes for transferring the injured from company and bataillon to the regiment's dressing station after having studied the topographical maps and the results from reconnaissance of his subordinates and - if received - of his superiors, and he will decide on the site for deploying the regiment's dressing station.

2. Radiation and chemical reconnaissance is closely related to the medical-tactical. While the general radiation and chemical reconnaissance belongs among the duties of the Chemical Service, every medical chief in the army is fully responsible for reliably protecting the medical units, formations and installations of the Medical Service under his command against nuclear explosions and chemical weapons. He must find structures and shelters which offer the best protection for the injured; he must order early investigation of the degree of radioactive or chemical contamination in the terrain so as to institute effective protective measures or order, if necessary, early evacuation of certain medical transfer stations from the endangered terrain. The organs of the Medical Service must also check on whether food and water are fit for consumption after radioactive or chemical contamination; this is part of the Medical Service's radiation and chemical reconnaissance.

3. The search for all factors affecting the epidemiologic state of the troops and their quarters is called epidemiologic reconnaissance.

The medical NCO's and feldshers of companies and bataillons determine the sanitary conditions in the quarters of their particular unit,

the condition of sources of water supply; they will search for vectors, etc. The regiment physician will collect data on the rate of disease in the population, the epidemiologic conditions in the anticipated field of operations, search for sources of infection in the localities of the troop's billets and complete the reconnaissance data obtained from the medical NCO's and feldshers [28].

His superordinate in the medical ranks will order constant epidemiologic supervision of the troop's billets and charge the special units at his disposal, e.g., the antiepidemic-sanitary-chemical unit of the division or antiepidemic unit of the army with the search for contamination of air, soil, water or food. The epidemiologists and microbiologists belonging to these units will work in close cooperation with the Chemical Service.

### 6.3. THE AIM OF MEDICAL RECONNAISSANCE

We would summarily state that the aim of medical reconnaissance consists essentially in seeking answers to two basic questions:

When and where can medical transfer stations be most conveniently deployed?

What is the epidemiologic state of the unit, its quarters and the terrain of the anticipated engagement?

Before selecting the site for deploying medical installations the medical chief in charge will ask himself the following questions:

Has the distance from the field of operations or the next lower station be chosen so as to keep travel time within the medically admissible limit?

How is the condition of incoming and outgoing roads?

Are there any objects nearby which might draw enemy fire?

Is water available in the immediate neighborhood?

How are possibilities for camouflage against air reconnaissance?

Are there natural or artificial formations affording cover against the effect of harmful factors from nuclear detonations or chemical weapons?

Where can the medical transfer station move under immediate threat?

What local means can be utilized?

Is the terrain contaminated by radioactive or chemical substances?

Reconnaissance of the epidemiologic state of billets and the terrain of the impending engagements will seek answers to questions such as these:

What is the rate of disease, particularly infectious diseases, in the unit and among the population?

How are the living conditions of the population, the sanitary and hygienic state of settlements and the water supply?

What is the state of the civilian public health service?

Are there potential carriers of pathogens in the quarters (insects, rodents, etc.)?

Are there signs pointing towards impending use of bacteriologic weapons by the enemy?

Is information available on the epidemiologic state of the enemy forces confronting us?

Are there any signs of contamination of air, soil, water or food?

The commanding physician must immediately make use of the reconnaissance data received, consider them when making his decision and report them at once to his superior for further use.

#### 7. FUNDAMENTALS FOR PROVIDING MEDICAL SUPPLIES

Without medication, dressings, surgical instruments, splints, disinfectants, stretchers, blood substitutes in short, without medical supplies the members of the Medical Service are unable to do their work.

The large number of medical casualties, specific features of the injuries and the war-related high expenditure of medical supplies require that large quantities of these goods be stored and forwarded under difficult conditions.

Provisions must be made for the required medical supplies to be on hand

in a sufficiently large assortment

in sufficient quantity

of the required quality

at the required time

at the predetermined place.

These are the duties of the medical supply service.

The Medical Service of the National People's Army is equipped essentially with commercial medical apparatus, instruments, pharmaceuticals and other consumer goods which are also used in the civilian health service; members of the Federal Health Service are thus quite familiar with these items. Provisions for equipment and supply for the medical units, troop formations and installations should follow the rule "as good as possible and no more than necessary," for frequent relocation of the medical transfer stations during engagement and operations with frequent maneuvers require that the inventory of medical and consumer goods be kept to a minimum - depending on the anticipated scope of medical care offered.

#### 7.1. FORMS OF PROVIDING MEDICAL SUPPLIES

There are several forms of medical supply provisions which must be sharply differentiated [43].

1. Current supply is the main form of supplying medical goods. It serves to fill regular requirements of the Medical Service. The rich assortment hardly differs from that used in peacetime. A monthly plan

and request for current supply goods is drawn up by the regiment or division physician on the basis of consumption standards and actual consumption determined for the preceding month. After the request has been approved by the higher medical authority, the current supply goods are shipped once or several times per month, depending on the situation, from medical supply bases (medical storehouses, pharmacies, dispensaries for medical supplies). They are transported packed in simple cases or bags. Shipment of current supply goods also provides replenishment for first aid equipment in the field.

While current supply - as mentioned earlier - constitutes the main form of providing medical goods it is not sufficient under modern fighting conditions. Frequent changes in the scope of aid to be rendered at the medical transfer stations, the periodic heavy influx of medical casualties, due to weapons for mass annihilation, and other factors affecting the work of the Medical Service require an additional form of provision called battle supply.

2. Battle supply consists of a rather restricted assortment of medical goods essential for medical aid at the medical transfer stations (dressings, analgesics, splints, stretchers, sera, syringes, etc.). Battle supply thus aims at rapid delivery of a sufficient quantity of the most important medical goods shortly before or during an engagement.

The request is based on consumption standards (so-called norms of battle supply, see 7.2.) for the medical casualties expected in the next one to two days. Battle supplies are shipped from the supply bases according to need and demand at any time of day or night.

This form of medical supply renders storage and carrying of large supplies by regiments and divisions unnecessary, thus reducing the required shipping space; it also renders medical units, formations and installations more mobile and the supply more operative. This kind of

medical supply provides for early availability of the most important medical goods at the required location.

3. The third form of medical supply is called operative supply. It aims at temporary enlargement of medical installations. Operative supply provides for support of the work of additional temporary physicians' or specialists' teams assigned to service at divisional dressing stations or field hospitals. These medical supplies remain at the disposal of the chief or director of the Medical Service who ordered them shipped; they will be removed after the temporary enlargement of the medical installation has been revoked.

## 7.2. MEDICAL SUPPLY GOODS

Two categories of medical supply goods are to be distinguished, according to stability and use: consumer goods and long-lasting supplies.

Among the consumer goods we count medication, dressing, disinfectants, splints, surgical needles, test tubes, thus goods regularly used up or which become useless after short use. Consumer goods are considered used up after having been dispensed by the pharmacy or dispensary for medical supplies upon request by the physician; with few exceptions no limits are set on their consumption or life.

Among the long-lasting supplies are items made of metal, wood, plastics or rubber which can be used frequently and retain their usefulness for some time; these obviously also include medical apparatus and instruments. They are written off as used up if they cannot be repaired or have been lost.

Another important form of differentiating medical supplies is based on the mode of supply, i.e., shipping and ultimate destination.

### Supplies for first aid field equipment

The medical field equipment (MFE) consists of the individual kit

for the members of the armed forces, the medics, feldshers and physicians, the squad's equipment (ambulance boxes) and the MFE consisting of aggregates, sets and individual instruments for units, troop parts, formations and special medical installations. Subdivision of MFE into aggregates and of those again into sets facilitates full delivery of standardized supply goods. These are packed in standard cases, bags or pouches. An aggregate or set consists of an assortment of medical consumer goods required for a certain scope of medical aid or the execution of specific tasks. Such functional structuring permits the use of identical aggregates or sets for medical field equipment at the various levels.

Current medical supply goods are grouped by norms. These are experimentally determined consumption standards and serve as the basis for setting requirements and making requests.

Request and shipment of medical battle supplies are also based on norms, those for battle supplies. After estimating the expected medical casualties and applying the battle supply norms to this figure, the medical supply goods required for assuring medical support of the engagement can be approximately determined during its preparation or during the battle itself. The norms differ for units, formations and hospitals; consideration is also given to the origin of the injuries, whether from firearms, nuclear, chemical or bacteriologic weapons.

Each supply base must stock certain reserves of medical supply goods. Size and assortment of these stocks are prescribed by the higher supply authority. These medical supply goods can only be delivered upon order by the chief in charge or head of the Medical Service.

Medical supply goods must also meet some specific requirements: they should be optimally light-weight, occupy little space, thus must not be unwieldy. They should be transportable, stable, resistant to

weather effects, easy to handle and to work.

### 7.3. THE ORGANIZATION OF PROVIDING MEDICAL SUPPLIES

The organization of supply of medical goods belongs among the obligatory duties of all chiefs or heads of the Medical Service. Depending on the echelon, special questions of supply are handled by military pharmacists or feldshers with special training (pharmacist's assistants). They are accountable to the chief physicians for organizing medical supply, and they execute this task with the assistance of the supply bases according to the principle "from up to down."

Organization of providing medical supplies involves the following measures:

1. The requirements for medical goods are calculated on certain dates and again separately in the preparation or course of a battle.
2. On the basis of the figured requirements a request is addressed to the medical superior for the necessary medical supplies.
3. After the medical superior has verified the need for the goods and given his instructions for delivery to the respective supply base, the medical supplies are obtained, checked and stored.
4. Allocation to the troop will be handled by the medical storehouses or dispensaries for medical goods on the basis of requests handed in by the lower authority.
5. Control on the proper use of medical supply goods and the organization for repair of damaged equipment and instrument also belong among the duties of providing for medical supply.

## 8. FUNDAMENTALS OF DIRECTING THE MEDICAL SERVICE OF TROOP UNITS OR FORMATIONS

Directing the Medical Service consists of a set of measures aimed at the proper employment of forces and means of the Medical Service in support of engagements.

This directive activity is highly complex due to the maneuvers characteristic for modern engagements, sudden change in the battle situation, far-ranging field operations and the heavy medical casualties which might suddenly materialize upon the use of devices for mass annihilation. The men responsible for directing the Medical Service of units or formations, i.e., the regiment or division physicians, should be both excellent physicians and officers. In addition to a thorough medical knowledge they should be familiar with the fundamentals of directing engagements, well trained in organization and tactics of the Medical Service; they should be capable organizers, able to take decisions; they should have courage and a sense of duty. Only true patriots and socialist officers of the Medical Service will be able to accomplish this difficult task. The medical command requires officers who will act strictly according to generally valid guidelines and directive principles, who can discern essentials rapidly, base their work on analysis, discuss important issues collectively, take unambiguous decisions, direct their subordinates on site and monitor execution of commands.

Experience shows that more than just a sufficiently large medical staff and the corresponding medical supplies are required for the medical support of engagements; they must also be properly employed and

skillfully utilized. Only if forces and means of the Medical Service can be concentrated wherever and whenever they are needed will the Medical Service accomplish its tasks; only then will the directors of the Medical Service achieve top performance.

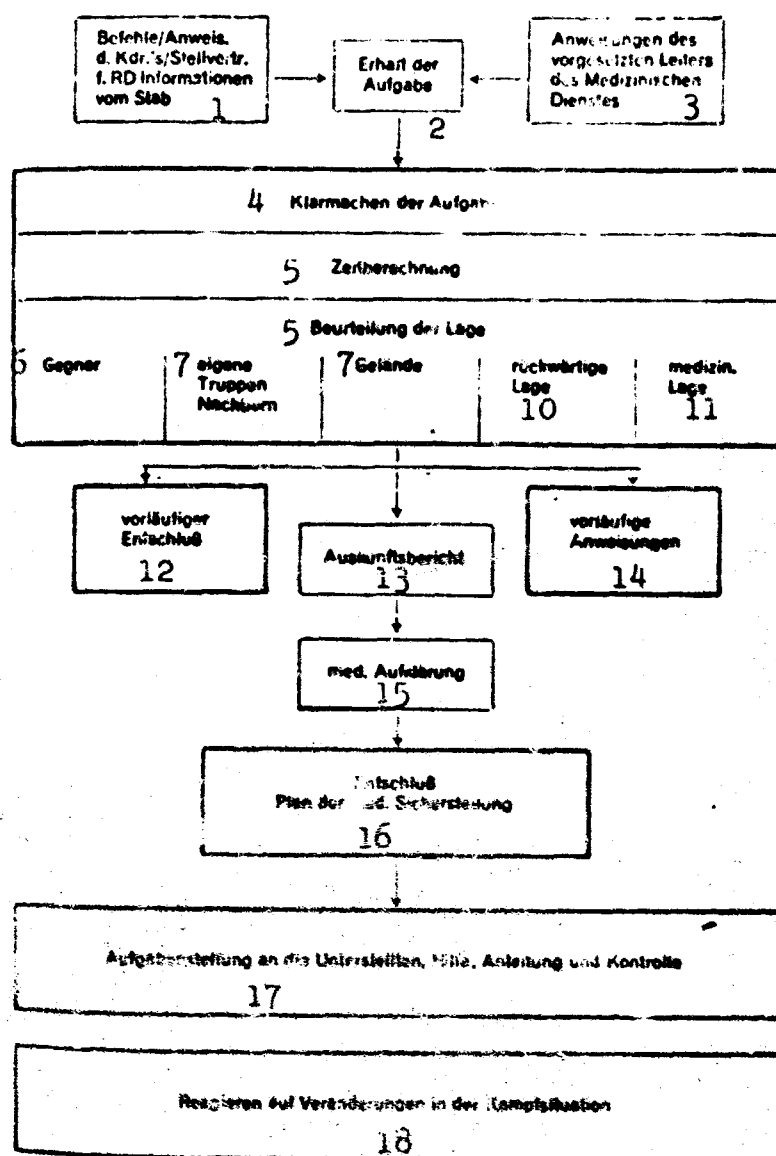
Its direction is no single campaign-like measure, rather a steady, everlasting process, a complex of measures in which various elements predominate at various times. Medical Service direction is achieved during preparation and in the course of engagements by a series of logical measures the most important of which are as follows: first, the medical chief must take an early and appropriate decision for the medical support of impending engagements; secondly, he must assign the tasks deriving from this decision to his subordinates, must aid and advise them, monitor execution of the tasks and thirdly, he must promptly react to changes in the battle situation and take new decisions if necessary.

Figure 20 shows the proper order of procedures.

#### 8.1. DECISION FORMING

In order to form a decision for the medical support of impending engagements the regiment or division physician should be familiar with certain assignments and data which he will receive from various sources; the battle assignment for the unit or formation, the Commander's decision and the corresponding order by the Second-in-Command for Rear Services will come directly from the Commander, the Chief of Staff or the Second-in-Command for Rear Services. The chief of the Medical Service will receive all the other data needed for his decision by studying the respective documents, plans and schematical representations received from the regiment or division physician. He will receive orders from his medical superior and seek data on the state of the subordinate forces and means of the Medical Service.

## Decision Forming



20 Schematic Representation of the Guilding Physician's Activities. 1) orders/instructions by the Commander/Second-in-Command for Rear Services, Information by the Chief-of-Staff; 2) receipt of assignment; 3) instructions from the superordinate director of Medical Service; 4) analysis of the assignment; 5) time calculation; 6) enemy; 7) own troops, neighbors; 8) evaluation of situation; 9) terrain; 10) situation at the rear; 11) medical situation; 12) preliminary decision; 13) scouting report; 14) preliminary instructions; 15) medical reconnaissance; 16) decision, plan for medical support; 17) assignments to the subordinates, help, guidance and monitoring; 18) reaction to changes in the battle situation.

### 8.1.1. ANALYSIS OF THE ASSIGNMENT

Immediately upon receipt of the assignment the director of the Medical Service will embark on its analysis. This analysis should prefer-

ably start on the way back from the staff meeting so that no time is lost; both the superior's ideas and the tasks assigned to the physician's own unit or formation must be analyzed in detail. The directing physician should try to arrive at an understanding of nature and conditions of the impending battle and draw the conclusions applying to his decisions. Conclusions applicable to the organization of medical support will differ according to whether an attack or a defensive operation has been planned, the obstacle of a water course must be overcome, a fight in the open field or street battles are anticipated.

#### 8.1.2. TIME CALCULATION

The director of the Medical Service will draw up a time table to determine the day and night periods at his disposal from receipt of the assignment to achieving readiness for battle. He must also decide how this interval shall be utilized by himself his collaborators and subordinates. He must accurately set down the time limits allowed for evaluating the situation, making the necessary calculations, conducting medical reconnaissance, completing the plan for medical support, etc.

The time available for preparing engagement will always be rather limited under modern fighting conditions. The directing physician will have to be guided by the generally valid principle of allotting minimal time to himself and the execution of his commander's duties and most of the time available to his subordinates and to theirs, for the faster he decides, the earlier he assigns the tasks to his collaborators and subordinates, the more time they have available for making their calculations, developing plans and taking the steps required.

#### 8.1.3. EVALUATION OF THE SITUATION

Evaluation of the situation involves determining all factors which may affect the organization of medical aid in the anticipated engagement. It is advisable to analyse the various factors separately in a

certain order, even if they are partially related and the conclusions require consideration in light of this relationship.

1. When judging the enemy the director of the Medical Service will search for answers to the following questions to draw his conclusions: How has the enemy grouped his forces? What is the combat value of the opposing enemy units? What reserves does the enemy have at his disposal, and is there a probability of his using devices for mass annihilation in the impending battle? How strong is the defensive force of the enemy's troops, and what medical casualties should thus be anticipated? Are they going to be heavy or relatively light, and should provisions be made in certain sectors and at certain times for a massive influx of injured and the liquidation of active foci? How would the probable medical casualties be structured?

2. Evaluation of one's own unit or formation is done for two purposes: How would the ratio of forces in the impending battle affect the rate of medical casualties, and in what sectors or directions should Medical Service forces be concentrated? Upon preparation of an attack, the commander of the Medical Service should, e.g., know the structure of his troops' battle order, the anticipated main direction, the width of the attacking front, the depth of the assignments and the planned speed of assault and should also know what assignments were given to neighboring formations for the impending engagements. By comparing this evaluation with that for the enemy, he will form an idea on the ratio of forces and can draw his conclusions for figuring the probable medical casualties and planning the most suitable employment of medical forces and means.

3. Evaluation of the terrain also aims at determining factors affecting the size and nature of medical casualties and the working conditions of the Medical Service. By studying topographical maps, apply-

ing reconnaissance data and also through personal observation, the director of the Medical Service will try to obtain a comprehensive picture of the terrain where the impending engagements will range. Cover against enemy reconnaissance, natural cover against active factors from nuclear detonations, the condition of settlements, road and street network, the sources of water, seasons and weather require attention, and their effect on the importance of medical casualties and the organization of medical aid should be estimated. A thorough evaluation of the terrain will essentially determine whether the advantages offered by the terrain, season and weather for our own actions can be maximized and drawbacks minimized. The organization of rescuing the injured, selection of evacuation and supply routes and the selection of sites for the deployment of medical transfer stations will also depend on the evaluation of the terrain.

4. When evaluating conditions in the rear the physician in command should consider how the organization of medical aid can be made optimally to accord with present and anticipated relocations of rear installations, particularly the camps. The vehicles supplying the front which return empty to the rear can always be most easily utilized for medical transfer of the injured if the medical transfer stations are deployed close to the camps or along the connecting roads.

5. Evaluation of the medical situation aims at appraising the condition of the Medical Service to ascertain whether the Medical Service will be in a position to accomplish the impending work and determine the need for additional forces and means. The physician in command must also consider the maneuverability of the medical units,--it may be reduced by an accumulation of not yet evacuated injured - consider the distances to the lower and upper stages of medical transfer and also take into account the epidemiologic state of the troops, of the billet-

ing area and of the area where the engagement is to take place.

#### 8.1.4. PRELIMINARY DECISION

Based on his conclusions from an evaluation of the situation and an imaginative consideration of the actual situation - which requires considering the interaction of the effects exerted by all factors - the directing physician will form a certain concept of the organization to be anticipated for medical support of the engagement. He takes a preliminary decision.

An evaluation of the probable medical casualties is basic for all organizational measures taken in support of the engagement; the former are the point of departure for all other considerations, calculations and decisions. There exist obviously no strict norms for estimating probable medical casualties; only careful evaluation of the situation and its comparison with earlier engagements under similar conditions will achieve true results. Estimating probable casualties is obviously harder the smaller the military unit, for medical casualties are highly accidental and subject to considerable fluctuations. It would be useless to anticipate the number of injured in a motorized rifle company or battalion; sudden massive fire by the enemy may upset all estimates. Hence, in estimating probable casualties, both regiment and division physicians may have to restrict their estimate to those caused by conventional weapons (see 11.1.1.).

If an evaluation of the situation has led to the conclusion that devices for mass annihilation may be used by the enemy, the commanding division physician will have to decide on keeping in reserve a part of the forces and means at his disposal to be employed in one or two active foci for organizing urgently required first aid before the arrival of the special forces and means sent by the army physician to liquidate the active focus (Independent Medical Departments for Deploying

Dressing Stations, Field Hospitals). It is the army physician's task to include consideration of the enemy's possible use of mass annihilation devices in his calculations for organizing the medical support of engagements extending over several days. Evaluation of the situation, experience gained in earlier operations and knowledge of fundamentals on the enemy's application of nuclear, chemical or bacteriological weapons constitute a useful basis for calculations and will yield true, applicable figures. The high-ranking medical commander will not limit himself to anticipating the total number of medical casualties; he will aim at determining their probable character, structure and distribution by combat periods and specific assignments. Only then will he be able to employ forces and means of the Medical Service properly in space and time.

Evaluation of the probable medical casualties will enable the directing physician to establish the scope of aid to be rendered at the various medical transfer stations. We would stress again that the scope of medical aid for a station must be established by the immediate superior, e.g., for the regiment dressing station, by the commanding division physician (see 4.6.).

Making a decision also involves determining the maneuvers of the forces and means of the Medical Service in the course of engagements (see 4.5.2.). Based on the evaluation of the situation, the director of the Medical Service must decide in which sectors or areas and at what time dressing stations should be deployed, how the inflow of injured is to be directed from one station to the next, i.e., how continuity in the treatment of the injured is to be assured.

After estimating the medical casualties to be expected and drawing up the probable maneuver of forces and means, the director of the Medical Service will calculate the need for ambulance vehicles in medical

support of anticipated engagements. He can do this only at this point, for he needs certain data; the probable number of the injured to be transported by ambulance (usually an average of 60% of medical casualties), average length of a round trip, average time required for such a trip, capacity of the ambulances, etc. The division's physician will plan to transport the remaining 40% of medical casualties in the empty trucks returning from the front; he will have to ask permission for the use of these vehicles from the Second-in-Command for Rear Services.

The director of the Medical Service will also order that the need for medical supplies be reviewed, particularly for dressings, splints, analgesics, blood substitutes, sera, stretchers, etc.

#### 8.1.5. REPORT ON THE SITUATION

Depending on the situation and time available, the Commander or his Second-in-Command for Rear Services may request a report from the directing physician, to be delivered at a predetermined date usually set at the time he receives the assignment. The report given by the director of the Medical Service, as well as those obtained from the other commanders of various arms and services will make it easier for the superior to take a decision, but it will also afford an occasion for the director of the Service to explain his ideas on support of the impending engagements, obtain his superior's assent and ask for the necessary support.

The report contains mainly a condensed evaluation of the situation and the conclusions drawn, thus the preliminary decision of the Medical Service director. In time calculations, the directing physicians must thus organize the time at his disposal so as to have completed evaluation of the situation and preliminary decision by the time he has to give his report. If he is to present his report in person, the regiment or division physician should keep to the following order:

In his introductory remarks he will briefly advise the superior of his evaluation of forces and means of the Medical Service, keeping to essentials and reporting only items of interest to the superior which he assumes necessary for the superior's decision.

He will continue by submitting his suggestions, showing how he intends medically to support the impending engagements. He will report on the anticipated maneuver with forces and means of the Medical Service, the organization of medical transfer and the anticipated scope of medical aid to be rendered.

He will summarize his evaluation on the extent to which the Medical Service is capable of accomplishing its assignments. He will end by asking - if necessary - for support in some matters (reinforcement by medical forces, allocation of empty truck space, execution of engineering work, etc.).

#### 8.1.6. PRELIMINARY ORDERS

Immediately after the director of the Medical Service has taken a preliminary decision on support of the engagements, he will issue preliminary orders. These orders issued to the subordinate medical chief serve to prepare his subordinates for the impending tasks and initiate preparatory measures for assuring medical treatment and transfer during the impending engagement. Occasionally certain forces and means of the Medical Service will require regrouping; specifically directed medical reconnaissance and sanitary-hygienic and antiepidemic measures might have to be ordered.

#### 8.1.7. MEDICAL RECONNAISSANCE

If sufficient time is available the chief of the Medical Service will attempt to sharpen his ideas on the situation and organization of medical support in the impending engagements, ideas which he has formed with help of topographic maps (he himself has a work map), i.e., he will

organize and conduct medical reconnaissance. He will also take the opportunity to discuss certain questions with the heads of other arms and services: with the head of the Chemical Service, the sectors and sites where special places for full sanitary treatment will be installed; with the communications officer, organization of communications between operation guidance and dressing stations; with the head of the food service, assurance that the injured will be fed, with the chief of clothing and equipment service, the creation of an exchange for underwear and uniforms at the dressing stations, etc.

#### 8.1.8. PLAN FOR MEDICAL SUPPORT

All the above preliminary work is required for formulating the final decision on the plan for medical support of the impending engagements. Decision making is thus a process during which partial decisions are taken in consideration of gradually accumulating facts and data and which ends with the final drawing up of the plan for medical support.

The plan for medical support consists of two parts: the graphic representation and the legend. Usually the chief of the Medical Service will enter the graphic part on his work map and the legend on the margin of the map (9).

The graphic part should contain all the elements of the decision which can be shown graphically. These are: the outline of the front, the location of rear and medical installations, the places and periods anticipated for deployment of medical transfer stations during engagements, supply and evacuation routes and routes for medical transfer, the radioactive, chemically or bacteriologically contaminated sectors, the field observation post and the rear command group as well as their axis of relocation, distribution of reinforcements for forces and means and finally the composition and distribution of reserve posts.

The legend contains all points of the plan not suitable for graph-

ic representation: formulation of the main assignment of the Medical Service in the impending operation, the scope of medical aid to be rendered at the medical transfer posts and its change in case the enemy applies devices for mass annihilation, assignment and organization of medical reconnaissance, sanitary-hygienic and antiepidemic measures, procedures for replenishing medical supplies, protective steps against harmful factors from mass annihilation devices, questions of organizing communications and the deadlines for sending information and reports.

## 8.2. DRAWING UP OF ASSIGNMENT, AID AND CONTROL

After the plan for medical support has been confirmed by the immediate superior (thus by the regiment's commander at the regimental, by the Second-in-Command for Rear Services at the divisional level), the head of the Medical Service must make the plan known to his subordinates, i.e., advise his subordinates of their assignments. He must also offer help and guidance in its execution and must monitor - preferably on site - adherence to his plan.

To take a decision, assign tasks and monitor their execution are directive steps taken by the Medical Service during the period of preparation for the engagement. It is obvious that decision and planning of medical support must not delay the execution of measures immediately required for organizing medical treatment and transfer of the injured in the impending operation. Due to the limited time available, it is probable that certain elements of the decision will frequently be neglected; only the commanding physicians' thorough, comprehensive knowledge and experience, their organizational talent and resolute actions will assure expedient decisions.

## 8.3. REACTING TO CHANGES IN THE BATTLE SITUATION

While the decision taken by the chief of the Medical Service during the preparatory period will serve as guideline for his conduct dur-

ing the operation, his early reaction to changes in the fighting situation is one of the important directive duties during operations.

An experienced chief of Medical Service will be well advised to be present on the field observation stand during decisive battle periods. Only then will the directing physician obtain early information on every change in the situation and every decision taken so as to draw conclusions for his own work.

By skillful and resolute maneuvering of forces and means of the Medical Services (see 4.5.2.) and by departing from the decision taken in the preparatory period, the physician will be able to adapt the organization of medical treatment and transfer to the specific battle situation and never lose control when directing the Medical Service of troop unit or formation.

## 9. FUNDAMENTALS OF MEDICAL SUPPORT OF ENGAGEMENTS OF A MOTORIZED RIFLE COMPANY OF A MOTORIZED RIFLE BATTALION

In the range of battalions and companies of a motorized rifle regiment, forces and means of the Medical Service must work towards creating conditions which permit early moving of the injured to the regimental dressing stations or their reception when arriving there under their own power, i.e., providing for early medical treatment of the injured. All organizational measures of the Medical Service in battalion and company should be directed towards this end. Methods and means of self-help, mutual help and first aid administered by the medics, medical NCO's or feldshers serve, firstly, to control manifestations from injuries which immediately threaten the combatant's life (hemorrhage, asphyxia, paralysis), secondly, to prevent complications which may lead to death, cause later disability or delayed wound healing and, thirdly, inhibit the effect of harmful factors, such as radioactive matter or long-acting chemical poisons. The performance of these tasks will essentially determine the further fate of the injured.

This responsible activity requiring thorough knowledge, manual dexterity, great skill courage and persistence is assigned to the member of the lower and middle rank medical staff, the medical NCO's of the motorized rifle company, the feldsher of the motorized rifle battalion and the medica of the ambulance corps of the motorized rifle regiment. These are the forces of the Medical Service who act within the competence of company or battalion, who establish first contact with the injured and whose work importantly determines the fate of the injured, poisoned and sick.

### 9.1 The Medical NCO of the Motorized Rifle Company

The medical NCO is responsible for everything concerning the Medical Service in the motorized rifle company (subsequently designated as "company"). He is directly subordinate to the head of the company and receives his professional orders from the battalion feldsher.

The medical NCO - like the medic - is equipped with a waterproof bag called the First Aid Packet. Its inner compartments contain dressings for taking care of 10-15 injured, tourniquets, a pocket knife with a curved blade for cutting open clothing, scissors, triangular bandages, notebook and pencil, adhesive dressing with zinc ointment and safety pins. The bag also contains Dolcontrol in injections and ampoules with a break-off tip for use against irritant gases.

Before the engagement, the medical NCO of the company should be briefed by the company chief on the operative assignments of the company and its units and by the battalion feldsher on the organization of medical treatment and transfer within the range of the battalion. He should know the locations to be taken up by the company chief and the battalion feldsher in the impending engagement, that of the ambulance transportation post and should have been informed on the axis of its relocation. He then should take careful note of the terrain, determine as far as possible the sites for assembling the injured, the routes for moving them, his own place where he will stay until the start of the battle and his own forward moves during battle. He should check whether the men of the company are equipped with their individual first aid kit, poison antidote and medical protective kit; he will replace missing items. If medics from the regiment's ambulance unit have been assigned to the company area he will carefully brief them on their assignments.

He must make sure that regulations on personal and billet hygiene are obeyed by the members of the company; upon instruction by the bat-

talion feldsher or regiment physician, he will perform simple sanitary and hygienic or antiepidemic duties. During preparations for a defensive operation, the medical NCO must make early provisions for a company ambulance post, a clearing station for the injured until they can be evacuated; he will stock this center, installed in an underground shelter or trench sector, with dressings, splints and water.

During the fight, the medical NCO must administer first aid to those injured who cannot help themselves or be helped by the comrades. He will carry or pull (see Figures 21 - 26) the injured into the next trench, depression or another kind of cover to protect them against further injury. He will try to place several injured into one such shelter. He must mark such protected accumulations of several injured, called wounded collecting centers, so that they may easily be detected by the medics who follow and who are charged with removing the injured from the battle field [37]. Such marking may be done in various ways, preferably agreed upon before the start of the engagement, e.g., by a piece of bandage (Figure 27) or by light signals at night.

There is one fundamental rule governing the medical NCO's activities in the field: he must never leave the area of the company, stay with the company all the time, never lose contact with the advancing units of the company [16]- which is quite difficult in the case of a rapid, successfully advancing attack. This is that he

- a) know at all times the company chief's location, knows where the latter stays so as to keep contact with him;
- b) know the situation in the company sector and in sectors of neighboring companies;
- c) know the whereabouts of the battalion feldsher and ambulance transportation post;
- d) that during the engagement he select a location affording opti-

mal observation of the field operation;

e) that he restrict first aid to those injured who require a life-saving intervention;

f) that he always leave rescue and evacuation of the injured to the medics of the regimental ambulance unit who follow (see 9.3) and who will also administer first aid to as yet untreated injured [25, 26];

g) since he has no time for a careful examination of each injured, he can determine the order of first aid requirements only on the basis of external signs (e.g., loss of consciousness, serious hemorrhage, burning clothes, stertorous, irregular breathing, gaping wounds, etc.).

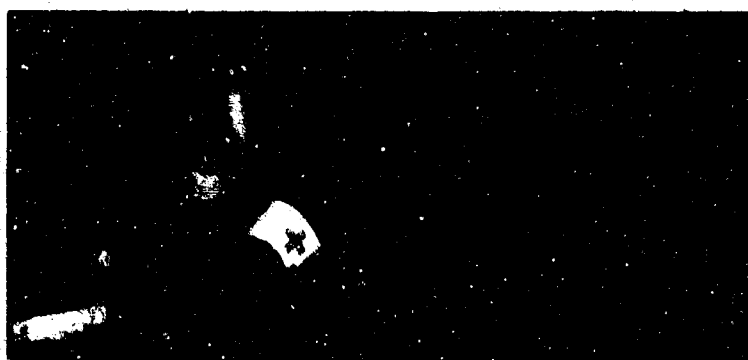


Fig. 21. Medic creeping towards a casualty.



Fig 22



Fig. 23

Figs. 22 and 23. Rescue of a casualty.



Fig. 24. Rescue of a casualty from a tank.

The work of the company's medical NCO is highly complex and involves great responsibilities as may be seen from the above. Aside from the physical and mental strain, its complexity derives from the fact that he has to do the initial basic grading of the injured on the battle field. If several men are injured at the same time he must decide whom he shall help first and how, who needs medical aid at what time and how this individual is to be transported to the regimental dressing station, the first post where medical first aid is available.



Figs. 25 and 26. Rescue of an injured from  
an armored tank



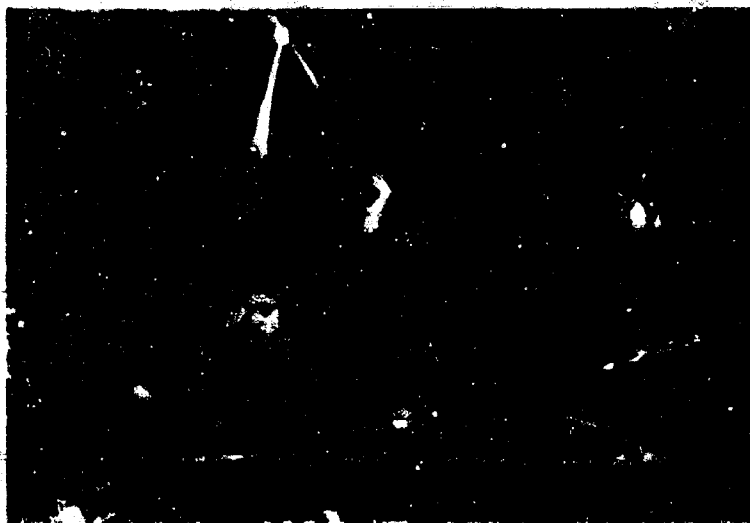


Fig. 27. Wounded collecting center

If the company units normally contain medics, their duties will be the same as those of the company medical NCO. It is his duty to direct and supervise their work.

#### 9.2. THE FELDSHER OF THE MOTORIZED RIFLE BATTALION AND THE TASKS OF THE AMBULANCE UNIT

The feldsher of the motorized rifle battalion (subsequently designated as "battalion") is responsible for all matters pertaining to the Medical Service in the battalion. He is directly subordinate to the commander and receives his professional orders from the regiment's physician. The feldsher heads the battalion ambulance unit.

The ambulance unit is equipped with the prescribed medical field equipment (MFE for motorized rifle battalions) and ambulance vehicles.

Before the engagement, the battalion feldsher should be briefed by both the battalion commander and the regiment physician on the impending tasks. He should be advised of the following [38]: the battalion's operative assignment and the battalion commander's decision, location of the battalion's field observation post, those of munition and supply

posts and the axis of their anticipated relocation; the routes established for inflow and outflow, organization of communications in the battalion and the signals ordered, place and time of deployment of the regiment dressing station before and during the engagement and the location foreseen for the ambulance transport post. The battalion feldsher should be familiar with all details pertaining to the regiment physician's decision, for the latter's plan for medical support of the impending field engagements forms the basis for the organization of his own work. Hence he must have accurate knowledge on what additional forces and means (medics of the regiment's ambulance unit!) the regiment physician intends to employ in this area, how rescue, collection and removal of the injured from the field of battle to the regiment dressing station is to be organized and which sanitary, hygienic, antiepidemic or other protective measures have to be taken.

In the short space of time available to the battalion feldsher for deciding on and organizing the medical support of the battalion's engagements, he will first analyze his assignment and conduct medical reconnaissance. He will try to anticipate which part of his area might suffer the highest medical casualties and establish the procedures for rescuing the injured. He will search for the most suitable roads and streets for evacuating the injured from the companies and consider the most appropriate use for the additional Medical Service forces and means assigned to the battalion by the regiment physician. He will submit his ideas on these questions to the battalion commander.

After having received the commander's approval of his suggestions for medical support of the impending operations, the battalion feldsher will start on the organization of all necessary steps. He verifies service readiness of the ambulance unit and briefs the medical NCO's of the companies on the impending tasks. He advises them of the location

of the ambulance unit before and during the engagement, on the location of the ambulance transport post, on the intended employment of the medics from the regimental rescue unit and the order and sequence of removing the injured from the field of battle. He checks on the stocks of necessary medical supplies within the company areas and orders replenishments of shortages. The battalion feldsher will spend the larger part of the time left before combat readiness is ordered on instructing the medical NCO's of the companies [57].

During the engagement, the battalion feldsher's most important task consists in organizing rescue of the injured from the battle field and their transfer to the regiment dressing station [1]. Rescue operations are assigned mainly to the forces and means of the regimental or divisional rescue and ambulance units which the regiment physician may decide to employ centrally or distribute over the battalions. The battalion feldsher must

- a) always be aware of the commander's location, never permit of loss of contact with him;
- b) know the situation in the battalion sector and the sectors of neighboring battalions;
- c) know the whereabouts of the regiment physician and location of the regiment's dressing station;
- d) in an attack, move his ambulance unit in the anticipated direction, called axis motion, for the battalion's ambulance unit;
- e) keep the battle field and the work of medics and medical NCO's under close observation, lend assistance in key spots or employ part or all of the ambulance unit for reinforcement;
- f) organize evacuation of the injured from the so-called wounded collecting centers (see 9.3.);
- g) render medical first aid if needed to the injured not yet taken

care of by medics or medical NCO's.

We would stress once more that under modern field conditions the primary function of the battalion feldsher, head of the ambulance unit, consists in organizing first aid and rescue of the injured. During a rapidly proceeding attack he will avoid "deploying" the ambulance unit at certain sites for fear of losing contact with his battalion. He will do his work "while moving:" he will work forward sector by sector from one wounded collecting center to another, from one group of injured to another, there to organize medical transfer to the regiment dressing station, supervise the medics' and NCO's work, help them; then, following the fighting troop, he will move with his forces and means to the next sector, the next wounded collecting center, the next site with injured accumulated there by the medics.

In a defensive operation the organization of medical care and evacuation presents some specific features: in a defensive battle the companies are located in a broad bounded defense area, the terrain is well known, and medical treatment and evacuation of the injured can be organized in detail. The ambulance unit of the battalion can deploy a well equipped battalion dressing station in a shelter. A drawback is the possible effect of the gradual contamination of the terrain which may cause deterioration of sanitary-hygienic conditions.

### 9.3. THE MEDICS OF THE REGIMENTAL RESCUE UNIT

The medics employed by the regiment physician within the area of battalions and companies will have to carry the main load of first-aid work, if we leave self-help and mutual help aside. In a field encounter, the regiment physician will find it expedient to distribute a part of this unit with their respective means, injured carts and stretchers, among the battalions, placing them under the command of the respective battalion feldsher. The rest of the unit will be employed either in the

direction of the main movement or will be divided into two groups which receive orders to move into alternate sectors and evacuate the injured not yet cared-for from the battle field (Fig. 28).

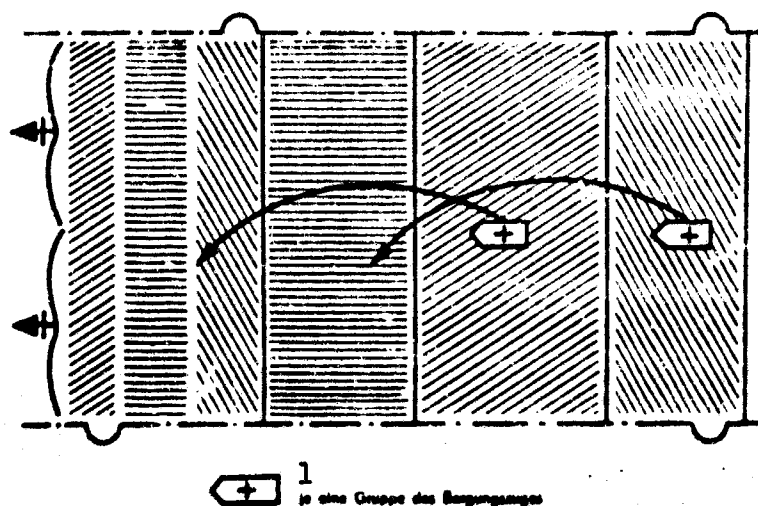


Fig. 28. Schematic representation of the organization for rescue of injured from the battle field [25]. 1) Each group of the rescue unit.

In a successful, rapidly advancing offensive operation, it would not be advisable to distribute the members of the regimental ambulance unit partially or completely among the battalions; the central employment of this unit is more appropriate, and rescue of injured should be organized to proceed in various directions or preferably by alternate sectors as described above. In this case the injured are moved by the medics of the rescue unit in injured carts or by other means of transportation towards the axis of motion of the ambulance unit, the latter following the battle order at a 500-1000 m distance. As the injured are concentrated in wounded collecting centers; their transfer will be organized by the battalion feldsher [25].

Rescue and evacuation of the injured will be much more difficult in case of massive medical casualties due to mass annihilation devices employed by the enemy. Under these conditions, the activity of medical

corpsmen and NCO's will be severely restricted; this is unavoidable, for they will have to extinguish fires, force a path and remove debris all at the same time to reach the injured. The troop commander will thus have no choice other than to initially assign first aid, rescue of the injured and their evacuation from the battle field to motorized rifle units who happen to be near the active areas and can be spared without endangering completion of the field assignment. This means that small units, platoons and companies, must be well trained not only in battle operations but also in liquidating results from an enemy attack with nuclear weapons. It further means that all members of the armed forces should be able to rescue the injured, administer regular first aid and move the injured to the dressing station [16].

An important characteristic of the organization of medical aid and evacuation in the battalion and company range is the requirement for many more medics in a defensive than in an offensive operation. During an attack the medic can drive his injured cart close to the injured individuals in the majority of cases, but during a defensive operation he must move the injured to sites, called injured collecting centers, to which the injured carts can advance. This means that the medics cannot devote the same amount of time to first aid as they do during an attack; therefore, the Medical Service of the troop must be reinforced, at least by auxiliary corpsmen. The injured will be taken by cart to the battalion dressing station or the ambulance transport post; from there they are transferred by the ambulances of the troop part to its dressing station.

#### 9.4. FUNDAMENTALS OF ORGANIZATION

In summary, we may assert that medical support of field operations of a motorized rifle company or a motorized rifle battalion, thus the organization of medical first aid, rescue and evacuation of the injured

to the regiment dressing station represents a highly complex and important part of Medical Service duties. The following guidelines merit particular attention:

1. Continuous contact between the medical NCO of the company, the medics of the regimental rescue unit and the battalion feldsher is an essential prerequisite for early administration of medical first aid to the injured under the complex conditions of today's battlefield, and for moving them to the regiment dressing station within the medically indicated time limit.

2. The medical NCO's and the feldshers must not leave the areas of their units; after short stops and completion of the most urgent tasks, they must constantly follow the fighting troop. They will accomplish this only if they limit their work to the main tasks: the medical NCO's to administering urgent medical first aid to the critically injured; the battalion feldsher, to organizing the rescue of the injured.

3. Under conditions of a modern offensive operation no time will be available for deploying dressing stations within the battalion area. The battalion ambulance unit will have to advance from one sector to the other, stop briefly to do its work where casualties are highest and then move on as fast as possible to the next sector.

## 10. THE REGIMENTAL DRESSING STATION

The regimental dressing station is an important stage in the system of medical treatment and evacuation of the injured. It is deployed by the medical company of the regiment upon recommendation by the regiment physician and by order of the regiment commander. The medical personnel active at the regimental dressing station has the following main duties: admission, registration and grading of the incoming injured, medical aid within the scope established by the divisional physician and preparation of the injured for further transfer.

### 10.1. HOUSING THE REGIMENTAL DRESSING STATION

The site for deploying the regimental dressing station during a battle should be selected so as to limit travel time of the injured to a maximum of 3 to 4 hours. The choice of location will thus always depend on the battle situation, the nature of the terrain and road and street conditions (see 4.5.1.). According to experience, the distance between the regimental dressing station and the first front line will amount to 3-10 km; at such distance, men with minor injuries will be able to reach the dressing station on foot and the severely injured by ambulance without undue delay.

Lodgings for the regimental dressing station should meet certain requirements: they should provide maximal protection against active factors from mass annihilation devices, should be well camouflaged and favorably situated in respect to road connections.

Under conditions of a densely populated field of operations, single farmhouses, solid buildings on the outskirts of settlements, ruins

or basements will probably always be found for deploying the departments of the regimental dressing station. If we consider that the dressing stations can frequently remain no more than a few hours on the same site during field operation involving considerable maneuvering, for rapid relocation is necessary in following the troop, we shall understand that time-consuming soil excavations and other work providing cover for the regimental dressing station can rarely be undertaken.

In their selection for a site, the regiment physician and the head of the regimental dressing station, i.e., the chief of the medical company, thus must make use of all available cover and camouflage possibilities. We need not stress the suitability of underground shelters abandoned by the troop or existing underground installations as lodgings for some departments of the regimental dressing station [59].

Since the regimental medical company will usually have to employ its own means and forces for building the cover required for deployment of departments of the regimental dressing station - for the commander will rarely be able to assign an engineering unit for this purpose - building by the engineers of separate underground shelters for housing the regimental dressing station will be restricted to the preparatory period of a defensive operation [62].

The building of lodgings for the regimental dressing station by the engineers depends on the following factors: the battle situation, the forces and means available (soldiers, engineers, engineers' tools and machinery), the availability of the necessary building material (particularly lumber), the time available, the nature of the terrain and the height of the groundwater level.

When structures are built by the engineers ample use will be made of the natural protection offered by the terrain: ravines, small valleys, back slopes, quarries and opencuts will afford some degree of protection

against active factors of a nuclear detonation, without depending on the execution of engineering work [34].

## 10.2. DEPLOYMENT OF THE REGIMENTAL DRESSING STATIONS

The individual departments of the regimental dressing stations must not be deployed too close to each other to avoid possible destruction and thus elimination of the whole dressing station by an enemy attack, nor should they be too far apart to avoid loss of time and forces in moving the injured to and from the department, thus a heavier work load. An attempt should also be made to provide for separate entrance and exit for each department to facilitate rapid channeling of the injured.

As a rule, the regimental dressing station will consist of the known departments (see 4.5. and Fig. 29). Complete deployment of all departments of the regimental dressing station will frequently prove impossible under modern conditions, particularly during a fast-moving assault; however, at least the most important departments, i.e., grading, transfer and dressing department, have to be deployed, equally the place for special treatment (if the enemy has used radioactive, chemical or bacteriological weapons). In this case, the activity of the medical personnel will be restricted to admission, grading of the injured and their preparation for further evacuation to the next stage.

### 10.2.1. GRADING AND TRANSFER DEPARTMENT

The largest part of the area is to be reserved for the grading and transfer department; the overwhelming majority of the injured will arrive here, and most of the injured will be cleared through this department. Here the injured are registered, graded and prepared for further evacuation.

A distributor post (see 4.4.) will be established at the place where the ambulances arrive carrying the injured rescued from the bat-

tlefield, i.e., at the car stop in front of the grading and transfer department. The post will usually be manned by a medical NCO who is also a dosimetrist. In a massive influx of injured, the presence of a physician at the distributor post may prove necessary and expedient; he will then classify the injured right on the vehicle without unloading. He will direct to the grading and transfer department only those who are critically injured and require immediate medical care. In some medical indications, such as severe hemorrhage or asphyxia, it may be necessary to direct the injured at once to the dressing department, bypassing the grading and transfer department. In this connection, we would again stress the function of the person manning the distributor post: he must attempt the highly difficult task of separating from the rest those injured who may constitute a danger for their surroundings. This means that he has to direct the wounded whose clothes or skin has been contaminated or poisoned by radioactive substances or chemical weapons to the place for special treatment, and men with suspected infectious disease to the department for infectious diseases (Fig. 29).

The grading and transfer department may be deployed, according to circumstances and requirements, in one or in several rooms. Deployment in two rooms has the advantage of, e.g., separating men with minor injuries from the seriously injured, thus easing organization of work and affording more rest to the serious cases.

The chief of the dressing station will work, assisted by several aides, in the grading and transfer department, for an older and more experienced physician will be better qualified to master the difficulties of classification.

The arrangement of a grading and transfer department may be seen from Fig. 30.

Here, in the grading and transfer department, the injured are re-

gistered and examined. They receive a snack (tea, alcohol, sandwich) medical care, if possible, the prescribed injections (according to indications, tetanus serum or antibiotics) and are grouped according to classification.

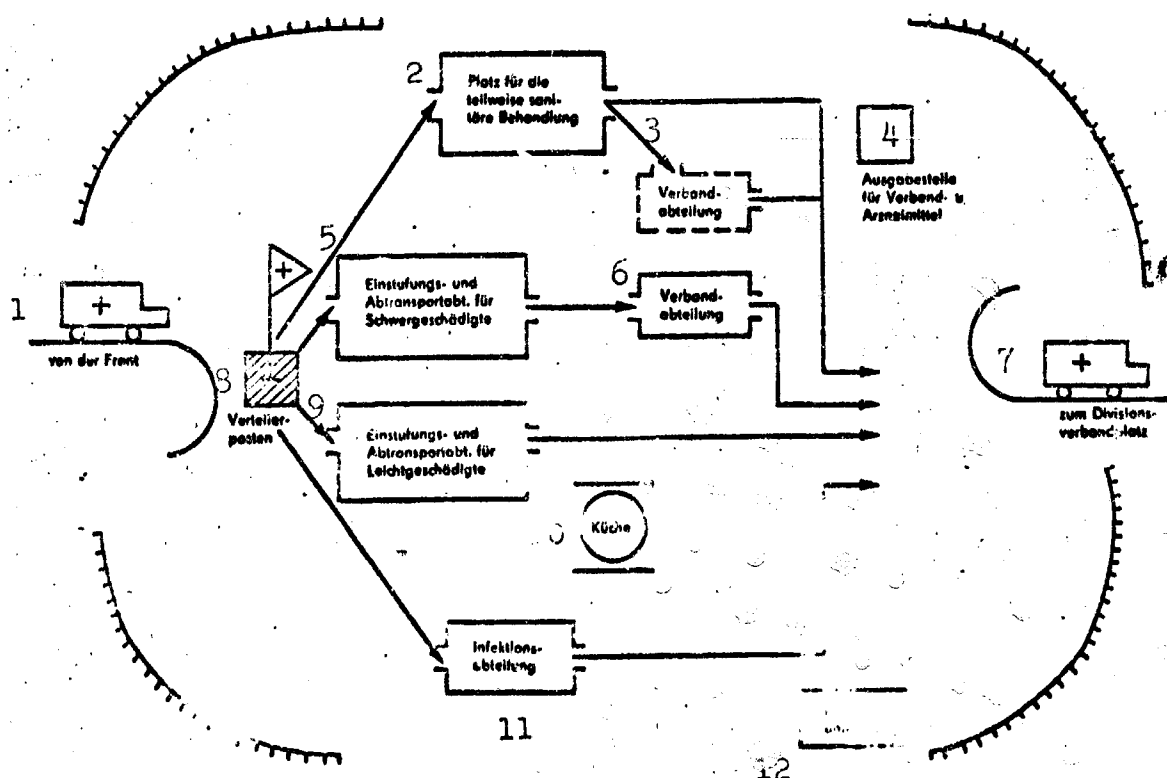


Fig. 29. Schematic representation of the deployment of a regimental dressing station. 1) From the front; 2) place for partial sanitary treatment; 3) dressing department; 4) dispensary for dressing and drugs; 5) grading and transfer department for severely injured; 6) dressing department; 7) to the divisional dressing station; 8) distributor post; 9) grading and transfer department for men with minor injuries; 10) kitchen; 11) department for infectious diseases; 12) quarters of the personnel

The injury card is also prepared in this department. It is one of the most important military-medical documents. Since the injured and sick members of the National People's Army of the German Democratic Republic may also reach field hospitals of allied armies during medical evacuation, the question on the injury card have been formulated in two languages, German and Russian. (see p. 119).

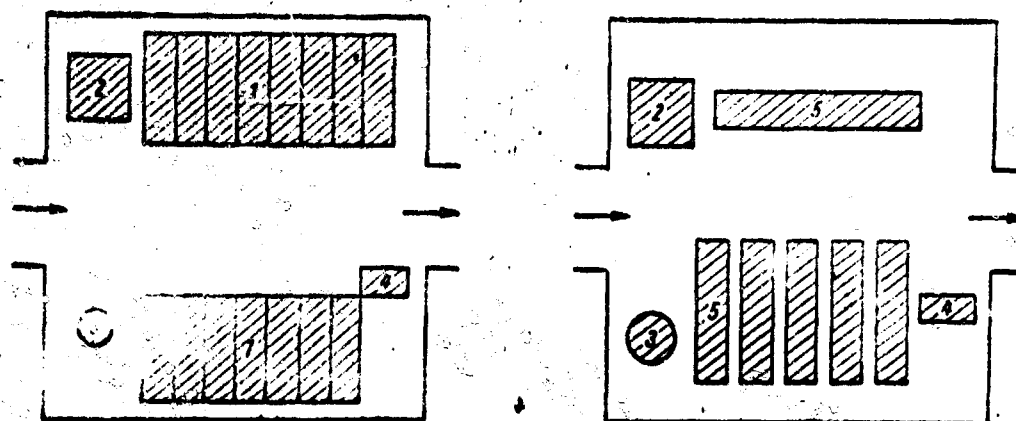


Fig. 30. Suggestions for installing a grading and transfer department a) for minor b) for major injuries. 1) Racks for setting down the stretchers; 2) table with dressings and medication; 3) wash basin; 4) table for writing records; 5) benches.

The injury card contains the injured's personal data, time and nature of the injury, medical aid rendered and the means of evacuation. After the card has been filled in, its left part will remain in the regimental files; the right part will accompany the injured to the medical installation where he will receive final treatment. There it will be added to the patient's other papers (case history) and filed in the archives at the end of the treatment.

The card is framed by variously shaded strips to be detached or left on according to diagnosis or indication: according to whether the

classifying physician considers immediate care, sanitary treatment (special treatment for radioactive contamination) specialized aid in gas poisoning or insolation indicated he will leave the corresponding strip on the card and detach those not needed. The following rules should be strictly adhered to: the individual strips are to be detached only after the required step (sanitary treatment) has been taken, the necessary aid (immediate care, specialized aid in gas poisoning) given or if no such step or aid is required. In combined injuries, several strips will occasionally be left on the card until the next or a later medical transfer station is reached. The other side of the injury card is filled in at the subsequent stations (divisional dressing station, field hospital of the front hospital base).

We would stress once more that medical classification of the injured is the most important function of the grading and transfer department at the regimental dressing station. The injured who urgently require medical first aid will be moved on stretchers by the medics into the dressing department of the regimental dressing stations while the others will stay at the grading and transfer department or be taken at once to the vehicle stop and evacuated according to instructions established in the classification. Those with suspected infectious diseases and others requiring sanitary treatment - who had been overlooked at the distributor's port - will be moved directly from here to the infectious disease department or the place for special treatment.

#### 10.2.2. DRESSING DEPARTMENT

The dressing department is to be deployed close to the grading and transfer department. It is manned by a physician and a helper (medic). Figure 31 shows how the room for the dressing department may be furnished. It should contain all the material prerequisites for rendering medical first aid (see 4.2.2.); any medical care which cannot be admin-

istered at the grading and transfer department will be given here [4].

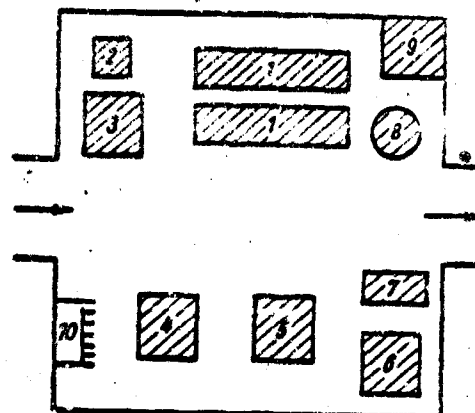


Fig. 31. Suggested arrangement of a dressing department. 1) Dressing table 2) boiler for sterilization; 3) table for instruments, sterile laundry and dressings; 4) splints for dressings; 5) table for injectable drugs and for blood substitute solutions; 6) medical instruments; 7) table for writing records; 8) wash basin; 9) heater; 10) racks for clothes.

#### 10.2.2. DEPARTMENT FOR INFECTIOUS DISEASES

The department for infectious diseases is a room designed for isolation, rather large depending on circumstances and requirements; it serves for the temporary isolation and lodging of patients with suspect or diagnosed infectious diseases. The patients in this room are placed under the periodic observation of one of the physicians and are cared for by a medic. Patients with communicable disease must be evacuated separately by separate ambulance as soon as possible to the department for infectious disease of the divisional dressing station or preferably to the unit's mobile field hospital for infectious diseases.

The chief of the divisional dressing station or the head of the field hospital for infectious diseases should preferably pick up the patients with infectious diseases in their own ambulances (according to

request by the chief of the regiment dressing station).

#### 10.2.4. DEPARTMENT FOR SPECIAL TREATMENT

The department for special treatment should be installed in a rather large room with an empty frontyard, or outdoors - this will always be possible in summer (Fig. 33). In consideration of the specific nature of sanitary treatment and decontamination, this site should be selected at a minimum 30-50 m distance from the other departments of the regimental dressing station on the downwind side.

The duties of the medical NCO-dosimetrist and the two aides assigned to this department involve monitoring of radiation in the men with radiation injuries, partial sanitary treatment of those with radioactive contamination or poisoning and decontamination, detoxication and disinfection of the means of transportation.

Partial sanitary treatment consists in washing the naked body with water, rubbing it with the content of the personal protective kit and rinsing mouth, nose and eyes. Decontamination of clothing and equipment consists in shaking out the radioactive dust. Work in the department for special treatment should be organized according to the principle clean side - dirty side; for separate processing, the injured who can walk will be separated from those to be carried on stretchers. The personnel of the department for special treatment wears protective mask, rubber apron, gloves and protective stockings during work[49].

We would want to mention that, should the injured treated here require medical first aid, the must not be taken to the dressing station; rather a physician should be temporarily assigned to the department for special treatment to administer medical first aid to this group of injured, or the dressing station should be divided to accommodate two channels of injured; then one dressing station would be devoted to medical care of the injured priorly subjected to partial sanitary treat-

ment and decontamination while the other one would serve for medical care of the other injured. Such organization is required to comply with the following basic rule: further medical evacuation of men injured by radioactive substances, long-acting chemical weapons or bacteriologic weapons must proceed separately from those who are neither contaminated nor poisoned. The reason may be sought in that the partial sanitary treatment at the regimental dressing station achieves a reduction rather than elimination of the contamination or poisoning. Therefore, this category of injured must be protected against penetrating radioactive substances, long-acting chemical poisons or bacteriologic weapons by wearing gauze, cottonwool or protective masks during further evacuation until they can undergo complete sanitary treatment and decontamination at the divisional dressing station or the hospital. It is of course understood that the ambulances serving for the transportation of these injured have to decontaminate, detoxicated or disinfected by the drivers at the site provided for this purpose.

Aside from the deployment of these most important departments of the regimental dressing station, shelter must be provided, according to circumstances, for the drug dispensary, the canteen and the personnel of the dressing station. The preparation of approaches for the ambulances should not be forgotten either; the ambulances of the divisional Medical-Sanitary Battalion intended for evacuation of the injured from the regimental dressing station to rear stations (divisional dressing station, military hospital) and the supply trucks of the regimental dressing station should be parked in protected lots close to the dressing station. There they will remain ready for use and may approach the departure stop only for loading.

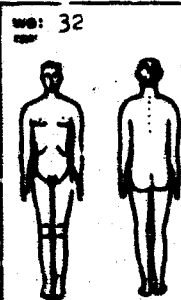
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Strahlenschädigung: 27  
Abkühlung: 28  
Verwundung: 29  
Erkrankung: 30  
Bemerkung: 31



Bemerkung: 33

Krankheitsgeschichte: mit / ohne  
Feldwunde: 29  
Wundheilung: gut / schlecht  
Feldwunde: 30  
Bemerkung: 31

Dringende Hilfe  
Chirurgische Versorgung

Tag und Stunde  
der Verletzung:  
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Monat: 36  
Tag: 37

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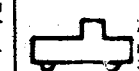
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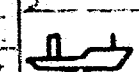
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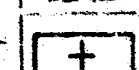
57 Sanbus



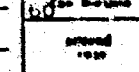
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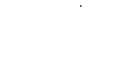
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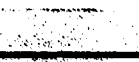
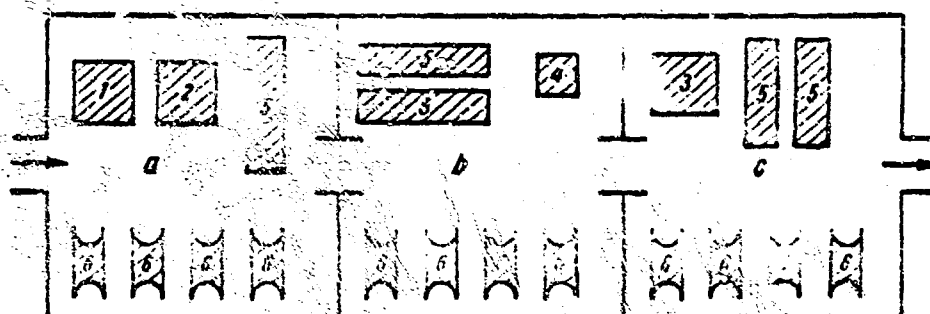


Fig. 32. Injury card. 1) Family name; 2) first name; 3) unit; 4) soldier, NCO, officer; 5) prisoner of war; 6) injury; 7) contusion; 8) burns; 9) exposure to cold (head, chest, abdomen, limbs); 10) poisoning through chemical weapon; 11) radiation injury; 12) radioactivation; 13) contamination; 14) disease; 15) remarks; 16) medical evacuation to; 17) date of filling in the card; 18) isolation - contamination; 19) family name; 20) first name; 21) unit; 22) soldier, NCO, officer, prisoner of war; 23) injury: penetrating shot, perforating shot, grazing shot, fragment, cold weapon; 24) contusions; 25) burns; 26) exposure to cold; 27) poisoning through chemical weapon; 28) kind: radiation injury, radioactivation, contamination; 29) with/without bone injury; 30) smooth/torn wound edge; 31) remarks; 32) where; 33) remarks; 34) immediate aid; 35) day and hour of injury; 36) tourniquet applied...loosened...loosened... (time); 37) tetanus vaccine; 38) date; 39) dose; 40) antibiotic; 41) date; 42) dose; 43) product; 44) gas gagrene serum (cattle, horse, sheep); 45) date; 46) dose; 47) medical aid: at the company post... hour...day; 48) at the battalion dressing station...hour...day; 49) at the regimental dressing station...hour...day; 50) when and where was the injury card established? 51) regiment dressing station....Regiment, date...; 52) division dressing station...Division, date...; 53) installation, date...; 54) physician's signature; 55) means of transportation; 56) truck; 57) ambulance; 58) by plane; 59) by boat; 60) by hospital train; 61) seated, lying down, on foot; 62) specialized aid in poisoning through chemical weapon; 63) sanitary treatment.

The deployment of all departments of the regimental dressing station will require a total of about 10,000 m<sup>2</sup> [57].



- a) = Platz zur Entkontamination / Desinfektion / Entgiftung
- b) = Platz zum Abliegen der Schutzbekleidung und der Schutzmaske
- c) = Platz zum Waschen, zum Spülen von Mund, Nase, Augen, zum Abtupfen von Händen, Gesicht und Hals
- 1 = Tisch mit Bürsten, Strohborsten
- 2 = Tisch mit Lösungen zur Entkontamination / Desinfektion / Entgiftung
- 3 = Zubehör zur Spülung von Mund, Nase, Augen und zur Hautbehandlung
- 4 = Behälter für abgelegte Schutzstrümpfe und sonstige Gegenstände
- 5 = Bänke
- 6 = Gestelle zum Absetzen von Tragen

Fig. 33. Suggested arrangement of a department for special treatment at a regimental dressing station. a) Place for decontamination/disinfection/detoxication b) place for removing protective clothing and mask c) place for washing, rinsing mouth, nose and eyes, for dabbing hands, face and neck 1) table with brushes and whisks 2) table with solutions for decontamination/disinfection/detoxication 3) accessories for rinsing mouth, nose, eyes and for treatment of the skin 4) container for protective stockings and other objects removed 5) benches 6) racks for setting down stretchers.

## 11. FUNDAMENTALS OF MEDICAL SUPPORT COMBINED OPERATIONS OF A MOTORIZED RIFLE REGIMENT

The Medical Service of a motorized rifle regiment (to be designated in the following as regiment) consists of the companies' medical personnel, the medical units of the battalions and the medical company of the regiment.

The medical company disposes of forces and means for medical evacuation of the injured from the battalions and independent companies, for deployment of the regimental dressing station, medical reconnaissance, the performance of sanitary-hygienic and antiepidemic measures and for providing the regimental units with medical supplies.

The commanding regiment physician is responsible for continuous medical support of the regiment's field operations; he is directly subordinate to the regiment's commander and is instructed, aided and supported in medical matters by the commanding divisional physician.

The following duties are incumbent on the regimental Medical Service; a) Search for and rescuing of the injured on the battle field, administration of first aid; b) evacuation of the injured from battalion and companies to the regiment's dressing station; c) giving medical aid within the scope established by the division physician, grading of the injured and their preparation for further medical transfer; d) supplying forces and means for liquidating results of an enemy attack with mass annihilation devices; e) continuous sanitary-hygienic monitoring in the units, medical reconnaissance of the regiment's billeting and operative terrain and prophylactic measures designed to pro-

note the health of the troop part's members; f) providing the units with medical supplies; g) training of all members of the troop part in self-help and mutual help; h) keeping medical records and making reports.

#### 11.1. MEDICAL SUPPORT OF AN ATTACK

Any imperialist aggressor must be beaten and annihilated on his own territory; this goal can only be achieved in an attack. Therefore, attack is the most important form of field operation.

Offensive operations in a possible nuclear war will be distinguished by certain characteristic features which should be taken into account in the organization of medical support. These operations will be characterized by speed, frequent changes in the fighting situation (alternating between marching, hostile encounter, assault, pursuit and defense) and the employment of the most modern weapons and fighting technique. Advances deep into the territory occupied by the enemy will contribute to the successful course of army and front operations and accelerate the defeat of the enemy. These specific features of modern attack will be reflected as follows in the organization of medical support:

1. The speedy advance will require that rescue of the injured from the battlefield, first aid, evacuation to the regimental dressing station and the rendering of medical first aid be combined with frequent relocation of the regiment's medical units. The commanding regiment physician will have to deploy the regimental dressing station with the forces and means of the medical company at places where the highest casualties are to be expected or have already been sustained, without losing contact with the attacking regimental battle order.

2. Since hostilities will take place over a wide unknown area, searching for the injured will be difficult. However, search and rescue must be done speedily, for one's own armored tanks, guns and the armored

troop carriers which follow may present a danger to the injured on the battlefield. Accumulations of injured and the wounded collecting centers must be particularly well marked (see 5.1.).

3. Massive casualties might be expected within a short time and in a narrowly limited area. Hence, the commanding regiment physician will do well to create a certain reserve of forces and means during the preparatory period of the attack; part or all of this reserve would be employed for liquidating active foci. It is always indicated to create such a reserve of medics, stretchers, ambulances, dressing and drugs, however reduced the forces and means at the disposal of chief of the Medical Service, for this reserve of forces and means will enable him to react to sudden changes in the situation.

The regiment physician will have to assure reliable communication between regimental and divisional dressing station, regimental headquarters and the feldshers of the battalions; this is a prerequisite for continuous guidance of Medical Service in combat.

It may happen that dispersed intact individual groups of enemy soldiers remain behind the rapidly advancing battalions. Therefore, particular attention must be directed towards protecting the regimental dressing station and the transports of injured. Protection and defense of the regimental dressing station, which must, as a rule, be assumed by its own forces, will involve protection against ground, air attacks and devices of mass annihilation. Continuous communication with the regimental headquarter, the setting up of observation posts, a plan for employing all of the personnel in defense of the regimental dressing station and the building of simple defensive installations (holes, trenches for cover) in the most endangered directions will serve for the protection of the dressing station.

#### 11.1.1 MEASURES REQUIRED IN THE PREPARATORY PERIOD

The time at the disposal of the regiment physician for preparing the medical support of an impending attack will usually be very short. He will have few hours at best. Hence, he must be able to evaluate the situation rapidly and arrive at a prompt decision. To this effect he will proceed in the known serial order (see 8.1.).

The experienced regiment physician will dispense with the figuring of probable medical casualties (see 8.1.4.). The importance of regimental medical casualties may vary - depending on the possible use of mass annihilation devices by the enemy - to an extent which renders anticipatory approximation impossible. He will have to count - depending on enemy resistance - on a daily average of 5-6% or more medical casualties in the regiment's ranks from conventional weapons. The number of medical casualties from enemy nuclear devices will depend on the battle order, the opportunities for taking cover, the caliber of the nuclear charge, the nature of the terrain and meteorologic conditions. While the regiment physician does not calculate the importance of probable medical casualties due to nuclear weapons, for this is impossible as shown earlier, and while he does not dispose of sufficient structured means and forces to organize medical care and evacuation from an active focus which might develop within the regimental battle order, the Medical Service of the formation must always be ready to participate with at least part of its forces and means in the liquidation of results from a nuclear enemy attack.

Support and guidance of subordinates in executing their assignments is one of the foremost duties of any executive, thus also of the chief of the troop part's Medical Service. The regiment physician will thus, during the preparatory period, assign forces and means to battalions and independent companies of his formation for rescue and evacu-

ation of the injured, without however renouncing the creation of a reserve at his call.

As far as time permits, the regiment physician will personally check on the readiness of the Medical Service in the battalions and organize cooperation between the ambulance units of battalions and the rescue unit of the regiment.

#### 11.1.2. ORGANIZATION OF MEDICAL SUPPORT DURING AN ATTACK

During the attack the commanding regiment physician should attempt to procure rapid and accurate information on every change in the situation, for any deviation from the earlier plan in the course of fighting will logically require a new decision. Continuous gathering of news by radio, telephone, messenger, and from ambulance drivers and men with minor injuries is thus an important prerequisite for the continuous guidance of the Medical Service by the regiment physician.

Only with an accurate knowledge of the situation can he, if necessary, maneuver his forces and means, employ his reserves or request help from the commander or the commanding physician of the division.

As mentioned earlier, repeated relocation of the regimental dressing station will be unavoidable during fighting if the maximum number of injured are to receive medical first aid. The medical requirement of administration of medical first aid to all the injured no later than 4 hours after the injury has been sustained can be met during a rapid offensive operation only if the regimental dressing station is relocated two or three times a day. The regiment physician will naturally attempt to keep time-consuming relocations of the regimental dressing station to a minimum, but this will always depend on the combat situation and the importance of medical casualties. The regiment physician will always attempt an early channeling of the injured coming in from battalions and companies to the anticipated new location of the regimental dress-

ing station. The faster and smoother the evacuation of wounded and sick from the regimental to the divisional dressing station ( by vehicles belonging to the Medical-Sanitary Battalion of the division), the more maneuverable the regimental dressing stations. We would thus stress in this connection that the successful solution of tasks assigned to the regiment physician will depend in a high degree on the personal, material and organizational support lent by the division physician.

The activity of the medical NCO's of companies, the battalion feldshers and the medics of the rescue unit during an offensive is fully governed by the principles laid down in 9.1., 9.2. and 9.3. The remarks we made on the divisional physician's duty are equally valid here; the regiment physician must continually organize the rescue and evacuation of the injured during battle, lend personal, material and organizational support to the medical NCO's and feldshers of companies and battalions and guide them in the performance of their tasks.

#### 11.2. MEDICAL SUPPORT OF A DEFENSIVE OPERATION

In a possible future nuclear war, defense will, just as attack, have certain characteristic features which will exert an important effect on the organization of medical support.

The goal of a defensive operation is to retain the occupied territory, repulse the enemy's attack, inflict considerable casualties and thus create favorable conditions for one's own determined offensive operations. Modern defense combat is characterized by great activity; the regimental units must always be ready for conducting a counterattack. In the defense sector, the units of the troop part are spread over a wider area than when initially positioned for an offensive; as a rule, the companies and battalions occupy positions built by the engineers, and the regiment usually receives fewer reinforcements than for an attack. For the preparation of a defensive operation, little time is us-

usually available to the leading staff; this interval will essentially be determined by the start of the enemy attack. Massive use of nuclear weapons and other mass annihilation devices will also be a factor of defense operations in a nuclear war. In modern defensive combat fought with tenacity and the application of all forces this will also contribute to frequent changes in the situation. Inroads by the enemy into one's own defense system and temporary isolation or encircling of some units fighting against superior enemy forces will alternate with sharp counterattacks. These features of modern defense combat will obviously exert their effect on the organization of medical support; under such conditions they will affect rescue of the injured, medical aid and evacuation:

1. A defensive operation usually affords more favorable conditions for searching for the injured and deploying dressing stations than an attack since medical casualties will occur most frequently in the trenches and underground shelters occupied by the troops and can easily be reached. Another advantage is the possibility for early reconnaissance of the terrain, during the preparatory period, in the sector to be defended and for selection of the most favorable sites for the wounded collecting centers and the deployment of dressing stations. The most convenient and best protected routes for medical evacuation can also be reconnoitered on time.

2. Another medical characteristic of defense combat is the increased difficulty of transporting the seriously injured, i.e., those to be moved on stretchers from the site where the injury was sustained to the place where they can be picked up by injured carts or ambulances. This is due, first, to the dispersion of medical casualties over the rather large area of the defense sector, second, to the fact that the seriously injured have to be carried by the medics over greater distances, for

the carts or ambulances cannot penetrate to the advanced positions. During an attack, medics can usually drive their carts close to the groups of injured, but in a defensive operation they might occasionally have to carry the injured on stretchers over considerable distances. For comparatively high medical casualties, this will result in a reduction of the time devoted by the medics to first aid. A much larger number of medics will be required than for an attack; therefore the troop's Medical Service must be considerably reinforced, at least by auxiliary medics. The injured will then be taken by cart to the deployed battalion dressing station or the ambulance transportation post from where they will be evacuated in the troop part's ambulances to its dressing station.

3. The danger that the enemy might temporarily penetrate one's own defense system, isolate or encircle units and thereby possibly obstruct medical evacuation calls for adoption of the following guidelines in the organization of medical support: dressing stations should be deployed at a greater distance from the foremost front line compared to that from the initial position in attack, alternates must be selected for the relocation of dressing stations, camouflage and protection of dressing stations require particular attention. Under these conditions early and rapid evacuation of the injured through the deeply echeloned stages of medical evacuation assumes even greater importance. For the same reason, reception capacity of dressing stations, particularly their grading and transfer departments, should be increased and the need for enlarging the scope of medical aid to be administered at the various stations anticipated.

4. Furthermore, the Medical Service of the formation must always be ready for medical support of counterattacking units. This may be achieved if the medical units are highly mobile, efficient reserves have

been created and the regiment physician is capable of prompt decisions.

5. We mentioned earlier that a lengthy stay of companies and battalions in the same defense sector and in close defense installations may lead to contamination of the terrain. It is understood that in such case the regiment physician must assign particular importance to sanitary-hygienic observation and antiepidemic measure.

#### 11.2.1. MEASURES REQUIRED DURING THE PREPARATORY PERIOD

Work to be performed during the preparatory period of a defensive operation will be essentially no different from that shown under 11. . 1. However, we would stress one important fact in the connection: the ambulance units of the battalions will deploy battalion dressing stations in well-built shelters (see 9.2.) where the injured can receive medical first aid on an enlarge scope, where position and fit of dressings, splints and tourniquets can be improved, the injured can be offered refreshments and food and be prepared for further evacuation.

The ambulance transportation posts will be moved as closely as possible to the first frontline, depending on opportunities offered by the terrain. As mentioned earlier, the regimental dressing station will have to be deployed at a distance from the first trench somewhat exceeding that for attack, without extending the 3-4 hours' delay for delivery of the injured. This will apply to a 6-8 km distance behind the first defense line. An alternate site, to be used only upon order by the regiment commander, will have been reconnoitered and anticipated a few kilometer further to the rear.

#### 11.2.2. ORGANIZATION OF MEDICAL SUPPORT DURING A DEFENSIVE OPERATION

Exactly as in attack, the main task of the formation's Medical Service consists in early search, rescue and evacuation of the injured from the battlefield, the administration of first aid and medical first aid. Depending on the combat situation, either the system of treatment

on location or that of evacuation will be accorded priority (see 1.2.2.). For considerable medical casualties - e.g., after a nuclear enemy attack which the enemy will attempt to exploit for territorial gain - evacuation of the injured from the wounded collecting centers, battalion dressing stations and the troop part's dressing station will have to be considerably intensified and accelerated, which determines reduction of the scope of aid to be rendered at the frontal medical stations. In such case, the regiment physician will consider it expedient to participate in the work at the regimental dressing station and request additional vehicles from the commander or division physician.

As may be seen from the above, maintaining communications and thereby obtaining constant information on the situation is one of the primary prerequisites for directing Medical Service in a typically active modern defensive operation.

### 11.3. MEDICAL SUPPORT OF THE MARCH AND OF A HOSTILE ENCOUNTER

When a regiment marches with trucks and armored tanks as part of the division on an individual marching route or in column with other formations - this is usually done at night - the regiment physician must consider certain particular features.

The troop is moving, the marching column spread over many kilometers. The aim of the march is to take the regiment within a predetermined time and in full combat readiness to another destination. The march thus represents a maneuver of forces and means.

Conditions, thus rules for medical support, will differ according to whether a hostile encounter may be expected during the march or no contact with the enemy is anticipated during a march in the hinterland.

If a hostile encounter may be expected, the commander will organize a cover for the move to protect the main forces of the regiment against a surprise attack by the enemy. The rear units of the battalion

of which the medical unit headed by the battalion feldsher is obviously also a part will follow the march columns of their battalions. The rear units of the regiment, led by the medical company, will march behind the main forces of the troop part.

Since all units of the troop part may suffer medical casualties during the march, forces and means of the regimental Medical Service should be distributed more or less over the whole marching column so as to provide for early first aid to the injured and sick and move them rapidly to the next medical installation. Depending on the nature of the impending battle the regiment physician will also reinforce the marching unit heading the formation with medical forces and vehicles. Thus, e.g., the Medical Service of a motorized rifle battalion employed as advance party will be reinforced by a physician, several medics and one to two ambulances [5]. Reinforcement will have to be provided for by the troop part; as a rule the ambulance vehicles will be assigned by the division physician upon request by the regiment physician. The former will also have to decide whether the regiment - again depending on whether a hostile encounter is expected - should be assigned further forces and means from the Medical-Sanitary Battalion for support.

#### 11.3.1. MEASURES REQUIRED DURING THE PREPARATORY PERIOD

The nature and order of the work to be accomplished by the regiment physician in the preparatory period of the march hardly differs from that for preparing an attack or defense. Evaluation of the situation and appraisal of the probability of a hostile encounter and if so under what conditions play a decisive role in the organization for medical support of the march. This centers on two tasks: medical reconnaissance (if it can be done) of the march route and proper distribution of forces and means of the Medical Service.

In the course of the reconnaissance the most favorable sites for

rest stops will be determined, the sanitary-hygienic and epidemic state of the terrain through which the march leads, the presence of nearby dressing stations and hospitals where the injured can be moved for medical first aid or special medical aid and sites for the possible deployment of temporary dressing stations. During the preparatory period, the regiment physician will pay close attention to hygienic supervision of food preparation and service and the supply of beverages - particularly in regard to rest periods. According to season and weather, steps have to be taken to prevent sunstroke or frostbite.

### 11.3.2. ORGANIZATION OF MEDICAL SUPPORT DURING THE MARCH

If the march proceeds under conditions that exclude a hostile encounter and if there are no dressing stations or hospitals close to the anticipated march route where - following agreement by the medical superior - the injured may be moved after receiving first aid, temporary dressing stations will be set up on time by order of the regiment physician at 40-50 km intervals in the immediate neighborhood of the march route, these are called temporary march dressing stations.

Such a temporary dressing station will be set up, depending on circumstances, by one physician with a few medical NCO's or medics. The equipment includes the required medical supplies and one to two ambulances.

If possible, the injured and sick should receive first aid at once right on the vehicles. They may remain on these vehicles until they reach the next dressing station where a physician will administer medical first aid and organize, if so required, further evacuation of the injured and sick according to the system "away from" to the next stage of medical evacuation. Otherwise the injured will be unloaded. They will have to wait with a group of injured under the supervision of medics until the arrival of the battalion feldsher or a physician who will

immediately take all necessary steps for medical care and evacuation [57].

Should a hostile encounter be expected during the march, the Medical Service of the spearhead or the advance party will have to be reinforced with personnel and material, occasionally with forces and means of the formation's Medical-Sanitary Battalion. Depending on a sudden change in the situation, the medical unit of the battalion which is employed as spearhead might deploy a partial or full battalion dressing station if contact has been made with the enemy and initial fighting has taken place. Depending on enemy resistance, the units of the troop part involved in the fighting and the importance of the casualties, the medical company of the regiment may be moved forward into the combat area to deploy a partial or full regimental dressing station according to need. Further organization of medical care and evacuation should follow the rules established for attack.

It may be seen from the above that medical units of the regiments must always be ready to deploy dressing stations during a march and to render first aid of an established scope, that medical reconnaissance, maintenance of reliable communications and expert appraisal of the situation are important prerequisites for the organization of medical support of a march or a hostile encounter.

#### 11.4. MEDICAL SUPPORT IN THE FORCIBLE OVERCOMING OF THE OBSTACLE PRESENTED BY A WATERCOURSE

On a potential battleground, the units, troop parts and formation of the National People's Army will have to force obstacles presented by watercourses of varying width and depth. A glance at the topographic maps will show that there exists a rather large number of watercourses offering defensive positions for the enemy; these have to be overcome by forcible crossing. Therefore the principles of organizing medical

care and evacuation of the injured during the forced crossing of such a watercourse should be mastered by every commanding physician.

A number of specific conditions characteristic for the forcible crossing of a watercourse require specific organizational measures by the Medical Service

A watercourse presenting an obstacle will be crossed rapidly - depending on the battle situation - as the continuation of forward movement in a successful offensive. This means that preparation and organization of the crossing must be done during the troop's approach to the watercourse, thus in a very short time. Forcible crossing of a watercourse usually takes place on a broad front and makes use of the most varied means of crossing, ferries and bridges; the units cannot be taken across and let simultaneously into battle on the opposite shore.

The medical support of a forcible crossing of a watercourse may essentially be likened to that of an attack. Maintenance of communication and early re-evacuation of the injured to the rear will present particular difficulties. The work of the members of the Medical Service will be complicated in that first aid administration and evacuation of the injured must be done either simultaneously or in rapid succession, first at the time preparatory to crossing in the concentration area, in the starter position, on the march or during pursuit of the enemy, then at the crossing sites and during occupation of the enemy shore, the widening of the bridgehead and finally during deep penetration into the enemy's defense.

#### 11.4.1. PREPARATORY MEASURES

During preparation for medical support of the forced crossing of a watercourse, the commanding physician, i.e., division physician and regiment physicians should apply the following rules:

1. In the forced crossing of a water obstacle during a forward

movement, the Medical Service of the advance parties must be reinforced with personnel and materials consisting of forces and means of the Medical-Sanitary Battalion of the formation or the medical company of the troop part (depending on the size of the advance part with medics, medical NCO's, feldshers or physicians accompanied by the corresponding medical supplies and ambulances).

2. Deployment of forces and means of the Medical Service on the opposite shore is to be kept to a minimum; this will make it easier to take the medical units to the opposite shore.

3. Care must be taken to have the forces and means of the Medical Service of units and the troop part cross early and in agreement with the order and time table established by the staff; the chief of the Medical Service must attempt to have a maximum of forces and means on the bridgehead, for this affords the possibility for enlarging the scope of first aid to be administered there and reduces the need for immediate return of the injured across the obstacle.

4. Until deploying of the divisional dressing station on the bridgehead the injured must be evacuated with the utmost speed from battalions and regiments and returned to one's own shore.

5. The regiment physician must create a sufficient reserve of medical personnel and vehicles at this call; this is much more important here than elsewhere. To accomplish this he will need the divisional's physician's support.

6. Early provisions must have been made to equip the units of the Medical Service with means for keeping the injured warm (blankets!) and treating those in danger of drowning (respiratory equipment!).

#### 11.4.2. ORGANIZATION OF MEDICAL SUPPORT IN THE FORCIBLE CROSSING

Medical support of the forcible crossing requires the organization of two kinds of medical installations: crossing dressing stations and

ambulance posts.

Deployment of crossing dressing stations is the divisional physician's responsibility; he will suggest to his superior which forces and means should be employed and the required number of these dressing stations. The crossing dressing stations, assigned essentially the same tasks as regimental dressing stations, will be formed either with part of the forces and means of the division's Medical-Sanitary Battalion or the medical units of special troop formations (engineer battalions, artillery regiment, etc.) [8]. Aside from administering first aid and medical first aid they must be equipped for treating those in danger of drowning.

They also have to organize the return of the injured from the opposite to their own shore. The crossing dressing stations will be installed at favorable sites at an up to 1 km distance from the shore.

Upon maintaining a ferry service, medical posts must be set up at both ends of the ferry stops, consisting of fieldshers, medical NCO's or medics; these are to direct the return of the injured from the bridgehead to their own shore by means of a shuttle service, administer first aid if necessary and assist in saving men from drowning. The crossing dressing stations will stop their work upon order by the division physician as soon as the first dressing stations of motorized rifle regiments or armored tank formations have been deployed on the bridgehead. The Medical-Sanitary Battalion or the Independent Medical Department (see 13.4.) will usually cross the water over a newly erected bridge after the bridgehead has been enlarged to a depth of a few km. Depending on the further course of the attack, dressing stations of troop parts and the formation will be deployed according to the known rules (see 11.1.).

The forcible crossing of watercourses makes particularly great demands on the Medical Service. Success will depend to a high degree on

organized cooperation between the Medical Services of motorized rifle regiments, armored tank regiments and special troop parts and also on close guidance by the divisional physician.

## 12. SPECIFIC FEATURES OF MEDICAL SUPPORT OF FIELD OPERATIONS AT NIGHT, IN WINTER, IN THE MOUNTAINS AND IN SETTLEMENTS

The presentations dealing with the main concepts on the character of a future nuclear war plotted by the imperialists (see 2.1.) reveal that such a war will be conducted without respite under any conditions — thus day and night, in all seasons, any weather and on any terrain. Each meter of ground will be the object of a hard fight applying all available forces and means.

The various conditions under which such fighting will take place must evidently be considered in the organization of medical care and evacuation of the injured.

### 12.1. SPECIFIC FEATURES OF MEDICAL SUPPORT OF NOCTURNAL FIGHTING

Combat at night differs in certain respects from that during the day: the battle order is more concentrated, visibility, thus orientability considerably reduced, the mental capacity for concentration declines rapidly, fatiguability increases and psychic factors (fear!) gain importance. The lack of good lighting renders work more difficult.

These conditions will complicate the search for the injured, their rescue and collection in groups and wounded concentration centers and the administration of first aid. This will increase the need for forces and means required for medical evacuation (auxiliary medics, stretchers).

At night all motor vehicles must drive with dimmed, sometimes even without lights; this will considerably reduce their speed. It means that ambulances, too, will drive shorter distances per unit of time

than in daylight.

These conditions will be reflected in the following specific organizational features of the Medical Service:

1. Medical reconnaissance, particularly study of the terrain should preferably be conducted during the day. Medics, medical NCO's and feldshers as well as ambulance drivers should attempt reconnoitering of the most favorable routes for evacuation of the injured while there is still light, and must also determine points of orientation visible at night.

2. Medics must be equipped with the necessary lighting equipment (flashlights, etc.).

3. The increased need for forces and means for medical evacuation must be met by assigning additional stretcher bearer units (each two medics with stretcher) to battalions and companies or employing soldiers as auxiliary medics by order of the commander.

4. The danger that the injured will not reach the dressing station on time due to the lower ambulance speed must be met by deploying regiments at dressing stations and also the divisional dressing station as close as possible to the fighting units and troop parts.

5. Since the danger of an attack by isolated or flown-in enemy groups on medical transfer stations is greater at night than during the day, protection and defense readiness of the dressing station should receive more attention.

6. If the use of nuclear weapons by the enemy is anticipated, the Medical Service must be ready to render aid to numerous members of the army injured by light radiation even if this involves only accompanying those with minor injuries to the dressing stations.

Medical support of combat at night certainly demands utmost expenditure of all forces from medics, medical NCO's, feldshers and mil-

itary physicians and also maximal discipline, concentration, courage and skill.

## 12.2. SPECIFIC FEATURES OF MEDICAL SUPPORT OF FIELD OPERATIONS IN WINTER

On Central- and West-European battlegrounds a temperature drop to -20 and -25°C must be anticipated in winter. While these temperatures do not compare with those registered at the polar circle or in other cold regions, such low temperatures, the frozen ground, a continuous snowcover and the short daylight hours will exert their effect on the nature of medical care of the armed forces and the organization of work assigned to the Medical Service:

1. At low temperatures and in deep snow first aid on the battlefield will prove a very difficult task. In every case the injured have to be rescued rapidly without undue exposure of body parts. Under certain circumstances, these worsened conditions may require the use of additional medics or auxiliary medics.

2. The transportation of injured to wounded concentration centers or ambulance transport posts may be accomplished by a variety of means; the employment of pullboats is indicated, such as used in peacetime for moving individuals injured in winterport accidents in the mountains. Sleds and stretchers on skis are also suitable.

3. Regiment physicians and the divisional physician will do well to deploy their dressing stations in winter as close as possible to well travelled roads and in solid, easy-to-heat structures. They will thus avoid the danger of interruption of incoming and outgoing injured due to snow drifts.

4. Provisions must be made at the dressing stations for serving hot drinks and hot food to the injured. Evacuation in heated ambulances is preferable. If no heated ambulances are available, the injured moved

in trucks must be wrapped in blankets and furs, equipped with chemical heating pads and transported over short stretches only.

5. In cooperation with the respective chief of the clothing and equipment service, preventive measures should be taken against exposure to cold and against colds among the members of the armed forces. The medical NCO's of the companies and battalion fieldshers should check on whether the men have been provided with warm underwear and waterproof boots, and they must see to it that rooms for drying wet clothes and equipment be installed.

6. The tendency of soldiers to huddle together because the shelters are cold, the possibly more frequent contact with the population and neglect of personal hygiene - opportunities for washing and bathing are rarer during the cold than the warm season - will logically result in a deterioration of the sanitary-hygienic state.

The members of the Medical Service should take this into account: they must tighten sanitary-hygienic monitoring and proceed in the early detection of men with suspected infectious disease. The medical personnel of companies and battalions will make sure that the combatants change their underwear regularly and obey the rules of personal hygiene.

7. Should the enemy employ nuclear weapons during a snowfall or in foggy weather, it must be assumed that radioactive substances descending from the radioactive cloud will cause a rather large number of injured to require special treatment, i.e., partial or full sanitary treatment.

Otherwise, the commanding physician's considerations and decisions in respect to Medical Service organization and tactics in winter will in no way differ from those under the usual conditions.

### 12.3. SPECIFIC FEATURES OF MEDICAL SUPPORT OF COMBATS IN THE MOUNTAINS

Even moderately high mountains and certainly alpine country will

imprint their mark on the fighting operations; this calls for a corresponding organization of medical care and evacuation of the injured.

The land is broken up, there are fewer settlements and roads suitable for evacuation compared to the plain. The mountain brooks flow rapidly, and their level is frequently subject to considerable changes. The tops of the hills are usually covered by forests. The higher elevations are characterized by sharp 24-hour temperature variations, low barometric pressure and intense sunshine alternating with foggy weather and considerable precipitation.

Due to the mountainous relief, the formation of a continuous front will usually prove impossible. Fighting will be conducted in several independent directions; the main forces will have to be concentrated along the valleys and roads [60].

From these conditions the following conclusions may be drawn for the Medical Service:

1. The largest number of casualties will be sustained along the roads, valleys and ravines, thus where most of the fighting will occur;
2. Search for and rescue of the seriously injured are more difficult in woods, ravines and depressions, among rocks and on steep slopes than in the plain. Since the medics of companies and battalions will occasionally fail to find all the injured, particularly those in scrub, between boulders and in other hard-to-reach places, another combing of the terrain by a special search party may frequently be necessary; this will consist of medics, auxiliary medics and soldiers specifically assigned to this task. Depending on the size of the combat unit, its organization will be the responsibility of the battalion feldsher or the regiment physician.

3. In the mountains, the number of men with minor injuries who can move under their own power will be lower than in the plain, for moving

over steep trails in the woods, through ravines and brush, over boulders and crevices is more cumbersome than on even ground. For this reason relatively more forces and means will be required to move the injured from the battlefield. The units fighting independently in different directions thus will have to be reinforced by troops of stretcher bearers.

4. The limited roadnet in the mountains also limits the mobility of medical units; this will render maneuvering during combat much more difficult [40]. Hence, the chiefs of the Medical Service will frequently be obliged to reinforce at an early date the Medical Service of independently operating units and troop parts. It might be indicated to assign a physician to a motorized rifle battalion or reinforce a regiment dressing station with a surgeons' team from the divisional Medical Battalion.

5. The dressing stations will have to be deployed as close as possible to the battle orders to avoid exceeding the medically indicated time limit for delivery to the regimental or divisional dressing station because of difficulties and delays in reaching and moving the seriously injured. The sites selected for installing dressing stations should be close to springs, free of dead wood and brushwood; valleys, wide ravines or plateaus are good sites.

In summary we may say that in the preparation and organization of medical support of field operations in the mountains the chiefs of the Medical Service should give careful consideration to two problems: first, the possibly required reinforcement of lower medical units with medical transfer forces and means and, second, to the time actually required for transporting the injured from one stage of medical evacuation to the other rather than the distances between the medical units.

#### 12.4. SPECIFIC FEATURES OF MEDICAL SUPPORT OF COMBAT ACTIVITIES IN SETTLEMENTS

The tactical principles which form the basis for directing combat in large settlements and towns will evidently affect the organization of medical support.

A characteristic feature of armed battle in large settlements and towns is the fight which must be conducted for each town district, each street, even each building. This is usually done with small units and independently operating assault troops. Nuclear detonations in settlements will severely damage or destroy buildings, water pipes and sewers and cause fires; considerable medical casualties will ensue.

These specific features must be taken into account in organizing medical treatment and evacuation as follows:

1. The independently operating units and assault troops must be reinforced according to size with medical forces and means. In the anticipation that men buried under debris may have to be dug out and injured rescued from ruins, an increase in the number of medics and stretcher-bearers for the units is essential; medics, medical NCO's and feldshers with the corresponding medical supplies will be assigned to the rescue squads. A search for locating the injured in ruins, in the upper floors and in attics of damaged houses must be organized.

2. For battles in small towns, dressing stations are best installed on the outskirts of the settlement rather than in town; for fighting in sizable cities, dressing stations should be installed in basements with reliable ceilings and in other presumably safe structures. The rooms used for this purpose should have a number of entrances and should be rather spacious since considerable casualties must be expected. Places for accumulating the injured should also be located in well-marked basements or ground floors of solid buildings.

3. The epidemiologic state of the billeting area, unstable or unfavorable due to the widespread destruction, may call for extraordinary sanitary-hygienic and antiepidemic measures.

The presentations on specific features of medical support of field activities at various times and under various weather and terrain conditions show that the chief of the Medical Service cannot approach the organization of medical treatment and evacuation mechanically; rather he ought to appraise the specific situation for every case, analyse all factors which affect medical support and make expert decisions in a creative spirit without recourse to old patterns. He will succeed the better, the better he integrates the physician's, officer's and organizer's knowledge, ability and qualities.

### 13. THE DIVISIONAL DRESSING STATION

For support of its field operations, the motorized rifle division disposes of an independent medical troop part called the Med.-San.-Battalion. The commander who directs it, a surgeon, is directly subordinate to the commanding division physician.

The following assignments can be met with the forces and means concentrated in the Med.-San.-Battalion: rescue of the injured from the battlefield and their evacuation from the troop parts to the divisional dressing station, the administration of medical first aid and special medical aid, performance of sanitary-hygienic and antiepidemic measures and supplying the divisional troop parts with medical goods.

In addition, the specialists working in the units of the Med.-San.-Battalion must instruct the subordinate medical chiefs in their specialty, i.e., the regiment physicians and the head of the regimental dressing stations; thus, e.g., the division physician will assign responsibility for the epidemiologic state of the troop and its billeting area to the head of the sanitary-epidemiologic unit of the Med.-San.-Battalion and request that the commander of the Med.-San.-Battalion or the head of the surgical unit guide and monitor the work of his subordinates in respect to surgery-related diagnostic and therapeutic questions. The quality of first aid on the battlefield and of medical performance at the regimental dressing stations thus depends essentially on guidance and control by the specialists belonging to the Med.-San.-Battalion.

These duties are reflected in the structure of the division's Med.-

San.-Battalion. The Medical Company whose forces and means serve to deploy the divisional dressing station, the San.-Epidemiologic unit, the rescue unit (with injured carts and other ambulance vehicles) and the supply units are the most important units of the Med.-San.-Battalion.

The work in the Med.-San.-Battalion is done by physicians qualified in various specialties, a dentist, a pharmacist, feldshers, medical NCO's, medics, nurses, and officer, NCO's and soldiers of other services.

Aside from the medical field equipment, the equipment of the Med.-San.-Battalion also includes amobile bacteriological laboratory, showers and disinfection installations, ambulances, trucks, a mobile set and other supplies.

### 13.1. TASKS CARRIED OUT AT THE DIVISIONAL DRESSING STATION

As mentioned earlier, the divisional dressing station is deployed by the Medical Company of the Med.-San.-Battalion. Under modern combat conditions, this is essentially no more than a clearing station; most of the injured will pass through it, i.e., those whose recovery will probably take more than five days. The rest is returned to the troop after receiving medical care or will remain temporarily in the so-called convalescent department of the Medical Company where they may be asked to lend a hand during these few days.

The following tasks are to be carried out at the divisional station: admission and grading of the injured, complete sanitary treatment if so indicated, medical first aid or special medical aid, temporary stationary treatment of the non-transportable injured, curative treatment of those injured who are expected to return to their troop within five days fit for active service, preparation of the injured for further medical transfer, temporary isolation of infectious cases until their evacuation into a hospital for infectious diseases, personal,

material and organizational support of the medical units in the division's regiments and battalions.

The scope of medical aid to be administered at the divisional dressing station is established for the individual case by the commanding army physician. It is thus highly variable, depending on the military and medical situation. In this connection we would mention that the scope of medical aid established by the superior has to be strictly adhered to and must not be changed without permission, for each arbitrary deviation from the established rules may disturb continuity in the treatment of the injured and bring confusion into the harmonized system of treatment in stages.

In analyzing the scope of medical aid to be rendered at the divisional dressing station, we should consider that out of total casualties in a nuclear war the share of injured requiring the care of an internist will considerably exceed that seen in the last two world wars. This means a considerable enlargement of the internist's tasks at the divisional dressing station (see also 3.5.).

Under conditions of a war conducted with mass annihilation devices, i.e., a sudden massive influx of medical casualties, the majority of the injured who reach the divisional dressing station will consist of those who have as yet received no medical attention, for at the regimental dressing stations medical aid had to be restricted to patients with an indication for immediate treatment. Under these circumstances, the scope of medical aid given at the divisional dressing station will have to be limited to giving medical first aid and urgent special medical aid. This means that the medical personnel assigned to the divisional dressing station must concentrate their activities on administering urgent special medical aid to the critically injured. This aim should already be considered at the time of injury grading at the distributor

post or at the grading and transfer department (see 13.3.1.). This category may be assumed to represent about one tenth of the injured reaching the divisional dressing station. The chiefs responsible for the Medical Service should also consider that the Medical Company of the Med.-San.-Battalion is capable of rendering urgent special medical aid with its own forces and means to about 30-40 seriously injured per day; in the same time interval 300-400 injured can be cleared through the divisional dressing station.

Urgent surgical intervention or measures prescribed by the internist are required for the following diagnoses: shock, acute anemia, serious internal injuries of thoracic, abdominal or pelvic organs, confirmed indication for amputation of limbs, brain edema, injuries of neck or face with danger of asphyxia, acute circulatory disturbances, acute renal insufficiency, pulmonary edema, etc. For lack of time, all other surgical interventions or internal procedures will have to be postponed for the next stage of medical evacuation, i.e., the field hospital. We need not repeat that under these circumstances - which will become the rule in a war conducted with mass annihilation devices - medical classification of the injured assumes extraordinary importance for early medical care and the organization of medical support in field operations.

### 13.2. SHELTER FOR THE DIVISIONAL DRESSING STATION

Depending on the battle situation, the divisional dressing station will be deployed behind the troop parts' battle order at a distance which permits delivery of the injured within the first 12 hours from the time of injury. The space required is an area of about 300 x 400 m. To simplify matters, the individual departments will be deployed in houses and basements on the outskirts of settlements, in the halls of inns, gyms in schools or abandoned underground shelters. Otherwise

the shelter selected for the divisional dressing station should meet the same requirements as those for the regimental dressing station (see 10.1.): it should be camouflaged, close to supply military supply and evacuation routes, in an area hardly accessible to tanks, away from objects which might draw enemy fire and close to sources of water supply.

The scouting party which selects the deployment site and a work party also belonging to the Med.-San.-Battalion will do certain preparatory work prior to deploying the divisional dressing station. The rooms designated for deploying the departments of the divisional dressing station must be cleaned, heated and marked, access and departure routes must be prepared and marked with signs, and a nearby site suitable for the landing and take-off of helicopters or ambulance airplanes must be searched.

The divisional dressing station should be established in 2-2 1/2 hours; the most important functional units, i.e., grading and transfer departments, dressing, surgery and shock department must be ready for admissions within 30-40 minutes after arriving at the new deployment site.

### 13.3. DEPLOYMENT OF THE DIVISIONAL DRESSING STATION

In deploying the divisional dressing station, two important rules should be adhered to: If there is a massive influx of casualties, the separation of the men with minor injuries from those with major injuries and the sick will always prove expedient in clearing the injured through the divisional dressing station. Separation is achieved by installing functional departments for the three different channels (see Fig. 34). The advantage of this guideline is obvious: by separating the critically injured who require immediate special medical aid from the stream of the others preferably as early as at the distributor post

quite and control are retained for the grading and transfer department for seriously injured and in the dressing surgical and shock department.

Now the second rule: since, as mentioned earlier, the divisional dressing station represents essentially a clearing station under modern battle conditions, the majority of injured and sick being scheduled for treatment until recovery only at the field hospital base or reserve hospitals, and since for massive medical casualties the overwhelming majority of injured will undergo no more than medical grading and preparation for further evacuation at the divisional dressing station, it is advisable to lodge grading and preparation for further transfer in one department consisting of several rooms, the grading and transfer department. This will simplify work at the divisional dressing station and permit an economical utilization of the available forces and means.

#### 13.3.1. GRADING AND TRANSFER DEPARTMENT

The grading and transfer department consists of a distributor post, separate rooms for grading the severely injured who must be carried on stretchers, for grading men with minor injuries who can walk and the sick, also rooms where the injured can be lodged safely after grading, surgery or other therapeutic measures to await further evacuation to field hospitals according to established priority (see Fig. 34).

The distributor post's work is done on a large empty site in front of the grading and transfer department, i.e., the car stop for ambulances or other vehicles carrying the injured from the regimental dressing stations. At the distributor post, assignments are filled according to known rules (see 4.4.). It is advisable to have the post manned by a well-trained physician who will do the initial sorting right on the ambulances and a medical NCO who is also a dosimetrist.

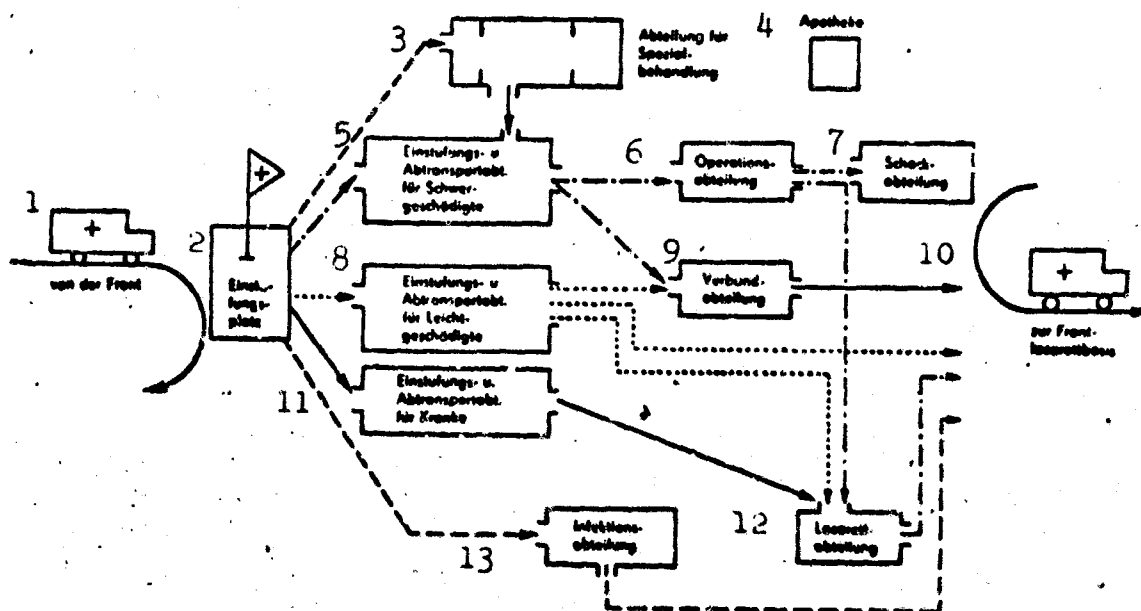


Fig. 34. Schematic representation of deployment of a divisional dressing station. 1) From the front; 2) distributor post; 3) department for special treatment; 4) pharmacy; 5) grading and transfer department for major injuries; 6) surgical department; 7) shock department; 8) grading and transfer department for minor injuries; 9) dressing department; 10) to the field hospital base; 11) grading and transfer department for the sick; 12) hospital department; 13) department for infectious diseases.

Here those injured who may present a threat to their surroundings are sorted out first: men contaminated by radioactive substances or biological weapons or those poisoned by chemical weapons are moved at once to the department for special treatment, men with suspect or diagnosed infectious diseases to the isolation station [33]. The other in-

jured will be taken to the respective grading departments. In case of urgency, the physician at the distributor post will bypass grading and transfer department for the critically injured for whom immediate special medical care is indicated and have them taken at once directly to the surgery or shock department.

The grading and transfer department should be housed in several easily accessible, preferably large rooms and dispose of sufficient empty space in front and separate entrances and exits.

The following is done here: admission of the injured, registration, medical grading and transfer indication for the specific department of the dressing station, or their preparation for further evacuation. To increase admission capacity, this department, like the hospital department (13.3.3.), is equipped with hook-in stretcher racks (Fig. 35). If no injury card (10.2.1.) has been established at the regimental dressing station, this will also be done here. The injured receive refreshments and food. If so indicated, the physicians working in this department will adjust dressings and splints and administer analgesics, antibiotics and sera.

The most important function of the grading and transfer department is the medical grading so as to distribute the injured over the various departments of the divisional dressing station and assign them for evacuation.

Assignment of the injured to the departments of the divisional dressing station by the physicians is based on the latter's evaluation of the injured's general condition and on the information entered into the injury card at the regimental dressing station. All this is done without removing dressings. The results of grading are shown by badges; the respective badges (see Fig. 18) are attached to the injured's uniform; this permits the medics to take the injured in time according to

established priority to the respective department.

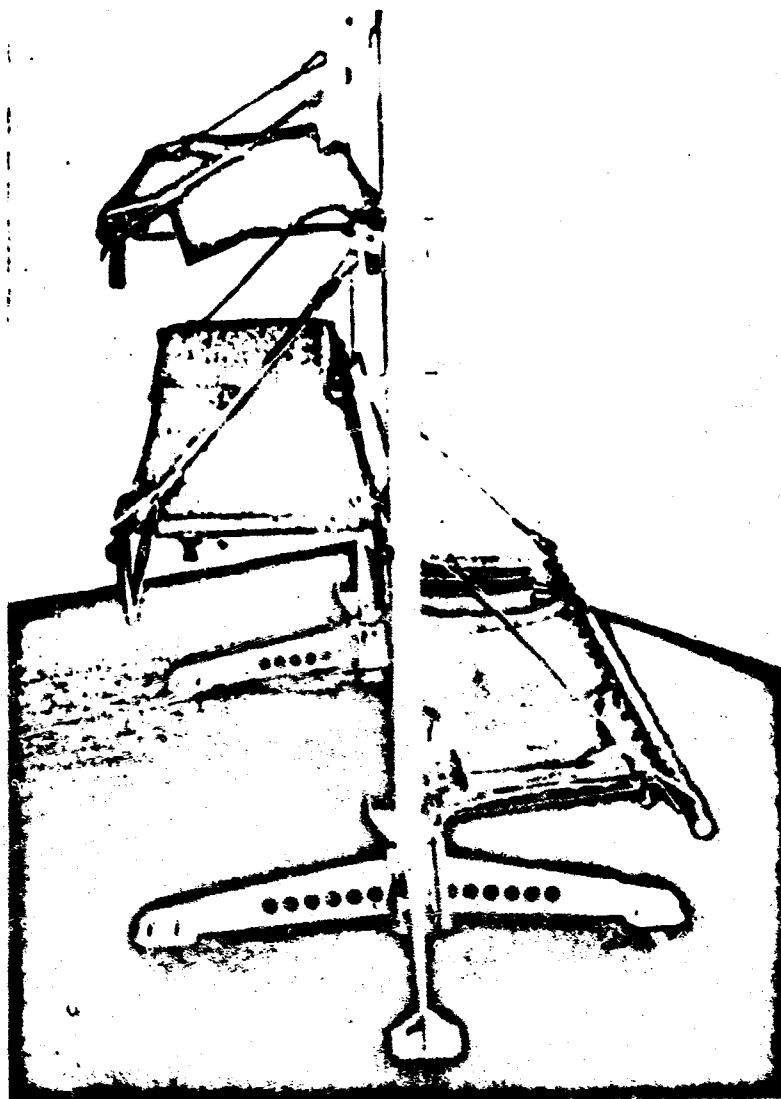


Fig. 35. Hook-in stretcher rack.

The so-called transport grading is done either at the grading or transfer department or at one of the other departments of the divisional dressing station, in any case at the point where the last therapeutic measure prior to evacuation was taken, for only at that time can it be decided whereto, with which transport, by what means of transportation and in what position the injured is to be transported. The results of such grading are recorded on the injury card.

From the divisional dressing station, the injured are taken by field or army vehicles to the medical front installation (mobile field hospitals) or further to the rear (reserve hospitals). The extent of evacuation, however, will fully depend on the fighting situation. During a successful offensive on a broad front, e.g., the extent of medical evacuation will lessen considerably if the field physician decides to deploy an advanced department of the field hospital base (thus a group of mobile field hospitals) within the area of a divisional dressing station. This advanced department of the field hospital base will then admit the injured and sick for further treatment. The ~~division~~ dressing station is thus emptied of injured, therefore ready for relocation to a new site behind the fighting troop.

### 13.3.2. DRESSING SURGICAL AND SHOCK DEPARTMENT

As may be seen from its name, this department consists of three parts: a dressing station for injured who must be carried on stretchers, a surgical department and a department for treating shock.

The dressing, surgical and shock department is designed to render special surgical aid, further specify the findings arrived at, at the grading and transfer department, treat shock and classify the injured treated here for transport.

The dressing station is usually operated by two surgeons' teams; it is advisable to provide three tables (examination boards, stands for stretchers, etc.) for each team. This will assure smooth, rapid surgical performance and increase the flow capacity of this department: on one table the medic or nurse may remove the old dressing applied on the battlefield or at the regiment dressing station, on the second another injured will be subjected to surgical intervention by the surgeon and his assistant, and on the third two medics or nurses will apply new dressing to a third after surgical treatment. A great deal of time is thus

saved, for the surgeon can move from one table to the other without having to wait until the injured has been placed on the table and the old dressing removed.

The dressing department is furnished like a surgical department, for all necessary surgical interventions are performed here except for operations on body cavities.

For installing the surgical department, two rooms should preferably be provided, one serving as a preparatory room. Depending on availability of personnel and materials, one or two surgeons' teams will be employed here. In this department where major surgery is performed, the work procedure should be organized similar to the dressing department, providing two operating tables per surgeon's team (consisting of the surgeon, his assistant and a surgical nurse); then the well-rehearsed team can start operating on the next injured while postoperative dressing is applied to the first.

The shock department, to be installed close to the surgery department and the grading and transfer department for the seriously injured, should provide space for holding about 30-40 injured [65]. This department is directed by an anesthetist; complete equipment, instruments and drugs [3] for the complex treatment of shock should be available.

### 13.3.3. HOSPITAL DEPARTMENT

The non-transportable cases are lodged in the hospital department. This is directed by an internist who will consult with a surgeon if so required [61]. The number of cots (Fig. 36, stretchers on stands with mattresses and bedlinen) to be installed at the hospital department depends on the combat situation and the extent of medical casualties. Aside from the temporary admission and stationary treatment of the non-transportable (postoperative) cases, the hospital department may be used for temporary stationary or ambulant treatment of those injured

who require no further evacuation.

The patients with suspect or diagnosed infectious diseases are to be isolated and treated in separate rooms until they can be transferred to the nearest military hospital for infectious disease; this should be done as soon as feasible.

The division physician and the commander of the Med.-San.-Battalion should always attempt to keep the number of non-transportable injured to a minimum, for their presence will considerably restrict the maneuverability of the divisional dressing station. While medical support of the division's field operations should be organized so as to keep the divisional dressing station deployed in one place for at least 12-18 hours and take care of the injured there (see 13.4.), this interval will not be sufficient for returning the non-transportable injured to the transportable state. This problem can be solved only by evacuating these injured either by airborne means of transportation (helicopters, ambulance planes) or have them taken over by the field hospital which follows the advancing field hospital base.

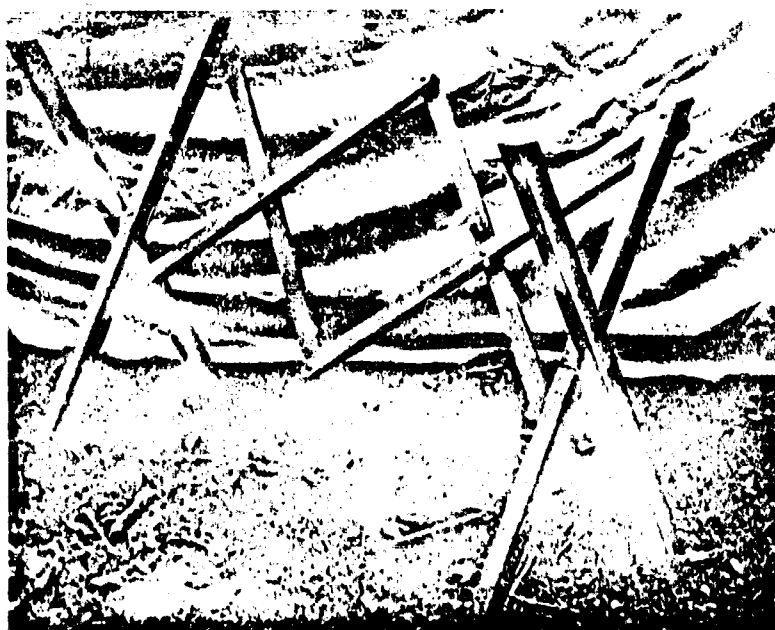


Fig. 36. Stretcher stand.

#### 13.3.4. DEPARTMENT FOR SPECIAL TREATMENT

The place for special treatment, should such be required, will be set up close to the grading and transfer department. The work at this department is handled by a crew wearing protective clothing and asks according to the known principle of the clean and unclean side; this requires a room for undressing, a wash and shower room, a dressing room and a place for decontamination or disinfection of contaminated or poisoned clothing and equipment.

The place for special treatment is usually manned by a feldsher and a few medics. If so indicated, radiation is monitored first, followed by complete sanitary treatment (for partial sanitary treatment see 10.2.4.). This includes washing or preferably showering the whole body with warm water and soap (to remove radioactive substances, residual chemical poisons or pathogenic agents from the skin) rinsing the mouth, washing the eyes and changing underwear and other clothes (obtained from the exchange stock to be carried along by the Med.-San.-Battalion).

After complete sanitary treatment the injured are directed or carried to the grading and transfer department where their further fate is decided upon.

#### 13.3.5. OTHER FUNCTIONAL UNITS

In addition to the above departments others will be deployed according to need and opportunities: a laboratory (for clinical and bacteriologic examinations), a dental station, a pharmacy and a store for medical supplies, the food supply department with the kitchen, stops for ambulances and supply trucks and lodgings for the members of the Medical Company.

Slit trenches must be dug and other covers created for injured and personnel.

#### 13.4. RELOCATION OF THE DIVISIONAL DRESSING STATION

We may conclude from the above presentations on the divisional dressing station that it is always indicated to fully relocate this important stage of medical evacuation; at the new site the departments urgently needed for admission and medical care of the injured should be deployed first, i.e., grading and transfer department, dressing, surgical and shock department and the pharmacy (see also 4.5.2.).

As mentioned earlier (13.3.3.), the deployed Medical Company, i.e., the divisional dressing station, should remain in one place for at least 12-18 hours to permit sufficiently organized and orderly care of the incoming injured and sick, for each break up, relocation and new deployment of the dressing station will have an adverse quantitative and qualitative effect on the work of its physicians. Thus the following conflict will always arise under modern combat conditions: on one hand, heavy medical casualties will require maximal retention of the divisional dressing station in one place; this is also required to allow the surgeons of the divisional dressing station sufficient time for surgical intervention and avoid the adverse effect of further evacuation on results expected from therapeutic measures (see also 4.7.). On the other hand, rapid field operations require that the station for medical first aid and special medical aid be deployed as close as possible to the battle lines. In this connection we would again mention the medical requirement (4.2.3.) that the injured reach the specialist within the first 12-18 hours.

This problem, characteristic for medical support of combat in a war conducted with the means of mass annihilation, may be solved if relief is obtained for the divisional dressing stations during an attack by engaging the aid of medical units of the same type, i.e., Medical Departments. These Medical Departments, brought into action by order of

the commanding army or field physician, will deploy dressing stations which differ in no way from divisional dressing stations.

The commanding army physician will thus dispose of means for supporting divisional field operations in a way which gives preference to the principle of treatment on location (2.1.) which is more favorable for the injured.

#### 14. RESUME OF THE MOST IMPORTANT THESES

1. War is the result of society's division into antagonistic classes, of the appearance of private property in the means and instruments of production. It is the product of a certain developmental stage in the socio-economic order of human society; it accompanied it as its social manifestation and will accompany it into history.

2. To abolish war, one must get at its roots and fight the exploitative order. War will disappear forever when conditions of socialist production prevail over all of our planet.

3. If the generation living in the middle of the 20<sup>th</sup> century does have the possibility to inhibit further wars, to banish war from people's life, it owes it to the fact that imperialism has ceased to be the prevailing and determining socio-economic system, for there exists a worldwide, economically and militarily powerful socialist system which decisively affects the course of world history.

4. A modern army cannot be conceived without a well organized Medical Service. In the socialist armies and thus also in our National People's Army, the Medical Service therefore assumes particular importance issuing from the high humane ideals of Marxism-Leninism. In our system, the human being, the conservation of his physical and mental forces assumes the center of social attention. Importance and role of the Medical Service have considerably increased under the conditions of a modern war which, unless inhibited by peace-loving men and states, will be a war conducted with the means of mass annihilation.

5. No organization even remotely resembling the Medical Service

existed in the armies of Antiquity and the Middle Ages. This could not be otherwise for lack of the prerequisites for developing a regular field medical service. These prerequisites came into being only with the maintenance of a standing army, the creation of installations for medical treatment, the availability of means of transportation for the injured and the development of the medical sciences to a level which made it possible to establish basic rules for treating the injured and sick.

6. The history of military medicine reveals a multiplicity of forms and methods for organizing treatment of the injured. However, the combined effect of two contrasting tendencies can always be detected: first, the attempt to treat the wounded and sick close to the battlefield (treatment on location) and, second, the tendency to remove the injured and sick from the battle zone, to evacuate them (evacuation system). Both tendencies in respect to the organization of treatment and care for the injured are components of a whole - this is a very important consideration - , and they are often closely linked. One or the other method will prevail, depending on various conditions and the specific situation.

7. The organization of medical treatment and care of members of the armed forces in wartime comprises all measures required for protecting the health of the troop's personnel, rendering early medical aid to the injured and reestablishing their fitness for combat or work.

8. The activity of the members of the Medical Service in a possible future nuclear war will be determined by certain characteristic features:

8.1. The maneuvering characteristic for modern battle, the frequent, rapid, often sudden shift in the fighting situation will importantly affect the activities of military physicians and their aides in

in the field.

8.2. The startling, sudden, massive casualties sustained simultaneously in many places.

8.3. The pathogenetic and clinical deviations seen in injuries sustained in armed fight. The frequency of wound infectious and shock following war injuries is a multiple of that seen in peacetime. In addition, injuries and diseases must be anticipated which are unknown in peacetime practice and which require special methods of treatment (combined injuries).

8.4. Most of the work will have to be done under primitive conditions.

9. The starting point for the assignment of duties to the Medical Service is the socialist military doctrine, the basic, unified concept on character and aims of a possible war, preparation of the country for repelling imperialist aggression and on questions relating to the build-up of the armed forces and their use in war. The military doctrine depends on many factors, is thus highly variable and requires constant verification. Under the present political, economic and military world conditions, socialist military doctrine has the following content:

9.1. A future war unleashed improvidently by the imperialists would represent the armed collision between the two antagonistic social systems, the capitalist and the socialist world system.

9.2. A possible war between these two world systems unavoidably would be a nuclear war.

9.3. This armed struggle would be characterized by as yet unknown ferocity involving the use of all available forces and means, the employment of armies numbering in the millions, high mobility and maneuverability of the troops over wide areas and into deep spaces, the lack of compact stable fronts and that of a sharp boundary between the

battlefield and the hinterland.

There would be many ways for striking surprise blows of unimaginable force both against the troops and deep into the hinterland. Decisive military results could be achieved within a very short time over any distance and over large areas.

9.4. The initial period will be of much greater importance than in earlier wars. It could decisively affect both the course and the outcome of the war.

9.5. Victory in this battle struggle can be achieved only by the combined efforts of all armed forces and all services.

10. These principles form the basis for a social doctrine of military medicine and for fundamental concepts on the extent and character of the casualties to be expected, medical support of national defense, the structure of the Medical Service of the GDR's National People's Army and its mission in wartime. These concepts must agree with the new socialist military doctrine and must be rooted in a realistic evaluation of the political, economic and military situation in Germany.

10.1. In a possible nuclear war between the two worldwide systems, there will be no basic difference between working conditions of the members of the Medical Service of fighting troop parts and formations of the GDR's National People's Army and those of their collaborators in the civilian health service on the soil of our Republic.

10.2. During the initial period which will decisively affect the course and outcome of the war and considering the probable comparatively short duration of a nuclear war, only those means will essentially be available which had been prepared in peacetime with a view to requirements in wartime.

10.3. The forces and means of the Medical Service available for first aid would never be sufficient in a nuclear war. Therefore, first

aid will have to be delegated in a large extent to laymen or the lower medical personnel, and the activity of the medical personnel (medics, medical NCO's, feldshers) will be restricted to routine tasks. This will -- let there be no doubt about it -- necessarily lower the quality of medical aid. Such basic consideration lead to the unavoidable conclusion that self-help and mutual help will assume primary importance in a future war.

10.4. Medical care and treatment will be organized on the main principle of rapid operative employment of mobile medical units and installations in sections and areas where mass annihilation devices applied by the enemy have caused heavy casualties.

The principle of treatment on location will certainly prevail but, depending on operative conditions, this will not exclude the evacuation of certain categories of injured to variously structured hospitals at the rear.

10.5. The boundaries of competence between the Medical Services of army units and between that of National People's Army as a whole and the civilian health service do not exclude the possibility of treating and caring for individuals injured on GDR territory at the nearest medical installation, be they members of the armed forces or civilians. Later transfer to the installation to which they belong (military or civilian hospital) is a secondary matter.

11. The general duties imposed on the Medical Service of the National People's Army in the case of national defense consist essentially in the following:

a) To save the lives of a maximum number of injured; to achieve rapid healing of their wounds, restore their fitness for active service and return them to their units.

b) To restore working capacity of the injured unable to return to

active service and keep invalidation to a minimum.

c) utmost prevention of the appearance and spread of disease among the troop.

These duties derive logically from the attention given by Germany's socialist unity party, the State Council and the Government to the well-being and health of its citizens; this is characteristic for our socialist GDR.

12. If on the basis of socialist military doctrine we accept the thesis that a possible future nuclear war will last but a limited time, we have to conclude that early medical and special medical aid for the massive influx of injured assumes primary importance, that this part of medical treatment and care will assume the center of attention and that final curative and postoperative treatment will in all probability and in the majority of cases be relegated to the post-war period.

13. The sum total of the above specific features characterizing the activities of the medical personnel in wartime requires that a scientific basis be established for all the prophylactic, diagnostic, therapeutic and organizational measures to be taken for health protection of the army in wartime. The study of these questions is the aim of the various branches of military medicine.

13.1. Military medicine is conceived as a complex of various medical disciplines representing the scientific basis for health protection of the army in peace and wartime and for prevention, diagnosis and therapy of war injuries.

13.2. Except for the discipline "organization and tactics of Medical Service", none of the military-medical disciplines exists independently; all represent specific medical disciplines enlarged to meet military conditions.

13.3. The discipline of organization and tactics of the Medical

Service explores the basic rules governing the proper organization of medical care and treatment of the troop in accordance with the state of medical knowledge, that of the art of warfare and military technique. Not only is the development of all branches of military medicine closely related to that of organization and tactics of the Medical Service, it cannot be conceived without it.

14. Each hostile encounter, each military operation, each battle causes human casualties. The number of injured and sick and the nature of their injuries largely determine the amount of work, organizational forms and work methods in the units, troop parts and installations of the Medical Service. Without an approximative idea on the medical casualties to be expected in armed fight, no Medical Service can be operated successfully.

15. The character of modern fighting, its speed and maneuvering and the anticipated massive influx of medical casualties logically require that aid to the injured be combined with evacuation. However, it should be realized that this procedure, fundamentally different from practice under peacetime conditions, is an - unavoidable - emergency solution, for it cannot but adversely affect the course of healing to some extent.

16. In consideration of all factors affecting the organization of Medical Service, the following requirements must be met for medical aid and treatment:

a) First aid to the injured on the battlefield must be given sufficiently early to save a maximum of lives and prevent dangerous complications during the healing process.

b) The injured must be taken with maximum speed to that medical installation where he will receive final treatment until recovery.

c) Continuity in the treatment of the injured must be assured by

appropriate distribution of therapeutic measures throughout the various stages of medical evacuation.

17. Early first aid can be achieved as follows:

a) The ability of the injured to give maximal first aid to themselves or to an injured comrade.

b) The proper distribution of forces and means of the Medical Service throughout the units and troop parts, the appropriate organization of first aid.

c) Maximally rapid rescue of the injured from the battlefield and speedy evacuation to the next station.

d) Location of dressing stations and hospital maximally close to the fighting troop or to the active focus caused by enemy devices for mass annihilation.

18. Rapid, directed, medical evacuation may be achieved by the following:

a) Conscientious medical grading of all injured at each stage of medical evacuation,

b) the availability of a sufficient number of rapid ambulance vehicles,

c) the deployment close to the frontlines of groups of mobile field hospitals disposing of every means for rendering special medical or specialized medical aid.

19. Continuity in the system of treating the injured will be achieved as follows:

a) Identical ideas on pathogenesis,

b) identical concepts on therapeutic methods,

c) accurate medical documentation.

20. Forms of medical aid: first aid, medical first aid, special medical aid, specialized medical aid. The earlier used division of all

measures and interventions before the injured reached the first physician into "first aid" and "premedical aid" are outdated under modern fighting conditions; considering the massive casualties to be expected, self-help, mutual aid, that given by medical NCO's and foldshers can do no more than try to control hemorrhage and prevent shock.

21. First aid and medical first aid should be directed primarily at saving the injured's life, control dangerous possible future or present complications and assure maximally rapid and comfortable evacuation of the injured to a medical installation where he can be treated by a specialist or remain until complete recovery.

22. Medical first aid should be obtained within the first 4 hours, special medical aid, i.e., intervention by a special surgeon or internist 12-16 hours after injury.

23. The art of organizing medical support of field operations will consist in administering specialized medical aid to the injured with maximal speed, to give him the benefit of special treatment as soon as possible. This can be achieved by deploying the mobile medical installations designed to render specialized medical aid as early as possible behind the battling troop or close to an active focus, or by rapid and careful medical evacuation to the field or reserve hospital, bypassing, if necessary, some of the stages. Full use should be made of possibilities to organize evacuation by bypassing some stages.

24. Accurate distribution of all therapeutic measures among the various stages, careful transportation, and the deployment of medical installations close to the front will contribute to minimizing the adverse effect of transportation and effectuate to a high degree the medically desirable principle of treatment on location.

25. Medical grading of the injured at the various stages is properly done according to the following points of view:

25.1. The initial grading must be done on the battlefield by the medic, the medical NCO or feldsher. After administering first aid he must

- a) establish priorities for evacuation of the injured,
- b) attempt to separate those injured who constitute a danger for their surroundings from the stream of injured and sick.

25.2. At the distributor post, the incoming injured must be divided into three channels:

- a) injured requiring sanitary treatment,
- b) injured who must be isolated,
- c) injured who require neither special sanitary treatment nor isolation, thus may be directed to the grading and transfer department or immediately to the dressing or surgical department.

25.3. The following groups of injured and sick should be formed at the grading and transfer departments of the stages of medical evacuation charged with rendering medical first aid or special medical aid:

- a) injured who require urgent care at that specific station (surgical intervention at the dressing or surgical department, treatment of shock at the shock department or other life-saving measures);

- b) those who cannot be transported (these can be found only at the divisional dressing station, for all injured have to be evacuated from the regimental dressing stations)

- c) injured who can be transferred, hence cases where further medical aid can be delayed. This group of injured must be further subdivided, identical to men with minor injuries and the sick, according to the following points of view:

- according to the destination of the next medical evacuation,
- according to the means of transportation,
- according to the kind of medical evacuation (sitting, lying down),

- according to the priority established for evacuation.

d) Men with minor injuries and the sick. In principle it will always be advisable to separate the influx of men with minor injuries and the sick from the rest of the injured. This will make it easier to oversee the dressing stations and help to improve the organization of aid for the seriously injured.

26. Since, during medical evacuation, the injured and sick members of the GDK National People's Army might also reach field hospitals of allied armies, the questions on the injury card must be formulated in two languages, German and Russian (see p. 139).

27. The selection of a site is of great importance for the deployment of a medical station. One will always try to utilize solid buildings on the outskirts of settlements, rooms in restaurants, gyms in school buildings, ruins, basements, or finished underground shelters abandoned by the fighting troop for installing the departments of the dressing station. Such lodgings will be the rule, for rarely will time, forces and means be available for a special engineered structure to house the dressing station.

28. While frequent relocation of the dressing stations will prove unavoidable under future battle conditions we should realize that folding up, relocation to a new site and the deployment required there will take precious time which cannot be used for immediate care and treatment of the injured. Each folding-up, relocation and new deployment of the dressing station will certainly have an adverse quantitative and qualitative effect on the work of its physicians.

29. Hence the following conflict will always arise under modern combat conditions: one, on one hand, heavy medical casualties will require maximal retention of the dressing stations, particularly the divisional dressing station, in one place (this is also required to allow the sur-

geons sufficient time for their surgical interventions and avoid the adverse effect of the discomforts of evacuation on the effects of therapeutic measures); on the other hand, rapid field operations require that the divisional dressing station be relocated on time and as close as possible to the battle lines. This problem can be solved if the commanding army or field physician relieves the strain on divisional dressing stations in the course of an attack by employing medical units of the same type, i.e., Medical Department. These Medical Departments will provide for early deployment behind the battle lines of dressing stations identical to those of the division, in alternation with the Medical Company of the divisional Med. San.-Battalion.

30. The principle of treatment on location should be helped to materialize whenever possible. It is better if the special and specialized medical installations go to meet the injured and treatment is carried out with their help at the place where the injury was sustained than if the injured is subjected to long rides to the dressing stations and hospitals occasionally worsened by repeated change of means of transportation.

31. An attempt should be made to relocate the stages of medical evacuation as rarely as possible without endangering early aid to the injured. This important principle will be realized whenever the chiefs of the Medical Service dispose of sufficient reserve installations and employ and utilize these properly and expertly.

32. Establishing the scope of medical aid to be rendered will serve the following two ends:

a) The injured must be taken on time to the medical installation where they can receive expert, curative treatment.

b) The stations of medical evacuation in the area of troop parts and formation must retain their maneuverability, thus freed with maxi-

mal speed from the injured accumulating there.

33. The scope of medical aid established by the superior must be strictly adhered to, for each arbitrary deviation may disturb continuity in treating the injured and bring confusion into the harmonized system of treatment in stages.

34. In a future nuclear war, the share of men with internal injuries out of total casualties will be much higher than in the last two world wars; for the first time in the history of military medicine the field internist will be just as important as the field surgeon.

35. The application of antibiotics, means for achieving preventive immunity, antidotes, the modern equipment of units, troop parts and installations of the Medical Service, the use of new methods for controlling pain and shock, employment of modern ambulance vehicles, particularly helicopters, will permit to reduce the scope of medical aid at the advanced stations to a minimum under certain conditions and to postpone all but life-saving interventions and measures until the stations further to the rear are reached.

36. For the same reasons it will be possible sharply to restrict the indication for hospitalization of some categories of non-transportable injured and to evacuate these.

37. During the preparation and in the course of field operations, the Medical Service of troop parts and formations will be guided by a series of appropriate measures; the most important of these are:

a) The commanding physician must take an early proper decision for medical support of the impending field operations.

b) He must assign the tasks deriving from this decision to his subordinates and the lower ranks, must help them, guide them and monitor their work.

c) He must react promptly to changes in the battle situation and

take new decisions if necessary.

38. In the area of companies and battalions of a motorized rifle regiment, the forces and means of the Medical Service must create the prerequisites for moving the injured on time to the regimental dressing station, or have them walk there. The following tasks must be accomplished by methods and means of self-help, mutual help and first aid applied by medics, medical NCO's or fieldshers:

a) The effects of injuries which immediately endanger the combatant's life must be controlled (hemorrhage, asphyxia, paralysis, etc.).

b) Complications must be prevented which may lead to death, later invalidity or delayed healing.

c) The effect of harmful factors must be prevented or at least reduced.

39. The medics of the regimental rescue unit assigned by the regiment physician to the battalion and company district will have to assume the main load of first aid administration, except for self-help and mutual help. During a successful, rapid offensive it will be advisable to divide the rescue unit with its means (carts and stretchers) into two groups for alternate sectional combing of the battlefield and for moving the injured not yet cared for.

40. If massive medical casualties are suffered, due to the use of mass annihilation devices by the enemy, the commander of the troop will probably have no other recourse but to initially assign first aid, rescue of the injured and their evacuation from the battlefield to motorized rifle units which happen to be close to the active focus, without however endangering completion of the field assignment. This means that small units such as platoons and companies must be well trained not only in combat but also in how to liquidate results from an enemy nuclear attack. This means further that every member of the armed forces

must be able to rescue the injured, administer standard first aid and evacuate the injured to the dressing station.

41. Continuous communication between the medical NCO of the company, the medics of the regimental rescue unit and the battalion fieldsher are an important prerequisite for assuring early medical aid to the injured under complex modern battle conditions and obtain their arrival at the regimental dressing station within the medically admissible delay.

42. The medical NCO's and fieldshers must never leave the area of their units; after stopping shortly and taking care of the most "urgent" tasks they must again follow the fighting troop. They will achieve this only if they keep to their main duty: the medical NCO's to administering first medical aid as a life-saving measure, the battalion fieldsher to organizing rescue of the injured.

43. It is inherent in conditions of modern offensive operations that no time will be left for deploying dressing stations within the area of battalions. The medical unit will have to advance from sector to sector, stop for a short time and do its work where casualties are highest, then move ahead with utmost speed to the next sector.

44. Creating a reserve of forces and means will always be indicated, however reduced the forces and means at the disposal of the Medical Service chief, for this reserve enables him to react to sudden changes in the situation.

45. During defensive operations the Medical Service must always be ready to give medical support to field operations of counterattacking units and troop parts. This can be achieved by high mobility of the medical units, the formation of efficient reserves and the Medical Service chief's ability to take prompt action.

46. On a probable battleground, the units, troop parts and forma-

tions of the National People's Army will have to overcome obstacles represented by water courses of varying width and depth through forcible crossing. A glance at topographic maps will show water courses at frequent intervals offering defense to the enemy; these must be crossed by force.

47. During the forcible crossing of a river troops issuing from a forward movement the Medical Service of the advance units must be reinforced with personnel and materials derived from the forces and means of the formation's Med.-San.-Battalion or the medical company of the troop part.

48. Deployment of forces and means of the troop's Medical Service on its own shore is to be kept to a minimum. This will facilitate the crossing of medical units to the opposite shore.

49. Provisions must have been made to have the forces and means of the Medical Service cross on time and in accordance with the staff's crossing time table. The chief of the Medical Service must attempt to have a maximum of forces on the bridgehead, for this will enable him to enlarge the scope of medical aid to be rendered there and reduce immediate re-transportation of the injured across the water.

50. Until a divisional dressing station is deployed, the injured must be evacuated with utmost speed from battalions and regiments and taken across to one's own shore.

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